DOCUMENT RESUME

ED 237 077 IR 010 907

AUTHOR Hodgson, Frank M.
TITLE Educational Computing in the Clarksville-Montgomery County Schools. A Five-Year Plan. Fall 1983-Spring 1988.
INSTITUTION Clarksville - Montgomery County Schools, Tenn.
PUB DATE 83
NOTE 103p.
PUB TYPE Guides - Non-Classroom Use (055) -- Reports - Descriptive (141) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Budgets; Computer Literacy; *Computer Oriented Programs; Computer Programs; Computers; Curriculum Development; *Educational Objectives; *Educational Planning; Elementary Secondary Education; Equipment Standards; Evaluation Criteria; Glossaries; Media Selection; *Microcomputers; *Public Schools; Rating Scales; *Teacher Education
IDENTIFIERS Software Evaluation; *Tennessee

ABSTRACT

This report begins with a summary and discussion of computer programs on site prior to fall 1983, classroom computers, mainframe computers, and major goals for computing. A chart summarizing methods of achievement of the system-wide computing plan details its goals, objectives, and actual or projected completion dates. An overview of computer-related use in the school system outlines three approaches that can be supported by microcomputers: instructional development, curriculum development, and teacher/administrative management. Guidelines for software review and evaluation include evaluation criteria, an evaluation form, and software review procedures. Additional topics covered include legal issues related to computing in the school system, standardization of computer hardware, current status and present system site location of computers, inservice and staff development, community involvement in school computing, organization for microcomputing, the Clarksville-Montgomery County School System computer curriculum, and the budget for the 5-year plan. An appendix presents a statewide Computer Literacy Plan for the seventh and eighth grades proposed by the Tennessee Department of Education, which includes tentative goals and objectives, outlines a plan for providing teacher training in computer literacy, examines the acquisition of microcomputer hardware, and lists additional resources needed at the state level. A seven-page glossary is also appended. (LMM)

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EDUCATIONAL COMPUTING IN

THE CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS

CLARKSVILLE, TENNESSEE 37040

A FIVE-YEAR PLAN

FALL 1983 - SPRING 1988

REPORT SUBMITTED BY

MICROCOMPUTER CURRICULUM COMMITTEE

FRANK M. HODGSON, CHAIRMAN

THROUGH THE OFFICE OF THE COORDINATOR OF INSTRUCTION

ASSISTANT DIRECTOR OF SCHOOLS

PETER L. KYRIAKOS

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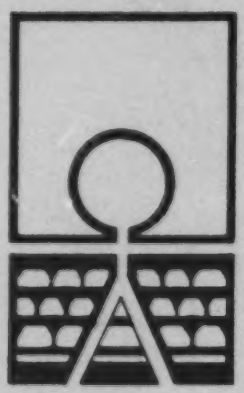


DR. WILLIAM B. ABEL, DIRECTOR

SPRING, 1983

IR010907

EDUCATIONAL COMPUTING IN
THE CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS
A FIVE-YEAR PLAN
FALL 1983 - SPRING 1988

Report Submitted By

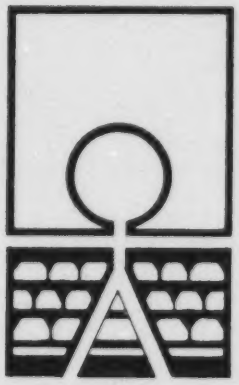
Microcomputer Curriculum Committee

Frank M. Hodgson, Chairman

Through the Office of the Coordinator of Instruction

Assistant Director of Schools

Peter L. Kyriakos



Dr. William B. Abel, Director

Spring, 1983

IR010907

PREFACE

The members of the Computer Committee would like to acknowledge the advice of Dr. M. T. Grady, Coordinator of Secondary Curriculum and Special Projects, Fort Campbell Dependent Schools. The committee has adopted Dr. Grady's software evaluation form of use in the school system.

The following persons served as participating members of the Computer Committee representing teachers, principals, coordinators, and interested parties in the preparation of the overall report:

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Other interested and cooperating members attending:

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CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS

FIVE-YEAR COMPUTING PLAN

Introduction

The Clarksville-Montgomery County School System recognizing the fact that we are living in an era of rapidly changing technology believes it is imperative that its schools provide their students with the knowledge and experience to become active participants in this highly technological world.

The future promises rich experiences as we interact more and more with the hardware and software of the various computer* related technologies. It is our belief that computer-based instruction will become a common method of instruction even though human instructors will continue to play an important role in the teaching/learning process. With the use of computers the potential is there to make the classroom a more imaginative and challenging learning environment. Teachers using computers can create an active learning environment where people are in control of the machines and are making appropriate decisions with them.

Recognizing the fact that computer technology is upon us, we believe it is imperative that we introduce the students to this exciting world. We must nurture the growing fascination with the field and provide within the classrooms the knowledge and experience necessary for the students to become familiar with computer capabilities and to learn to control their use.

*For the sake of further clarity in reading this report the term "computer" shall mean microcomputer, minicomputer or mainframe computer, depending on the context in the written material where the word is used.

Present Computer Programs on Site Prior to Fall of 1983

Currently the students of the school system are already experiencing the use of the classroom computer. The system is also presently rich in having currently on site able and talented teaching and administrative personnel capable of present and future curriculum, instruction and administrative work concerning the use of computers in the classroom.

Classroom Computers

Northeast, Clarksville High School, Northwest and Montgomery Central High School are at present using a computer science curriculum called "Computer Power." This program is to explore ways to reduce "computer anxiety" and increase problem solving skills.

The Vocational Center implemented a computer literacy program in 1979. This program is used to instruct students in computer languages, use of business programs dealing with sales, invoices, payrolls, and purchase orders. Advanced students are experiencing data entry programs and program descriptions. Further student work is also coordinated with student textbooks and software programs for exploration.

Under Continuing Adult Education classes are being offered in BASIC language using a text developed by Albrecht, Inman, Zamora, and another by Clark and Drum. These courses also, as with others mentioned previously, are developed in such a manner to provide students and adults with a historical background and introduction to computers.

All these current operating programs are instructed by gifted, well organized and student centered instructors in the

school system. Response to the class offerings from both students and adults has been very good. This truly shows not only interest from students and adults, but the talent of the teaching instructors who have given the remaining teachers and administrators examples of what can be achieved. The system owes these individuals a great debt for taking the instructional and curriculum lead in the use of computers for education.

Mainframe Computers

The system is also fortunate in its current status concerning large scale capacity for system-wide computing. Since January, 1977 the system has experienced on-site, available usage of a large computer system. Previous usage of computing was through "the Service Bureau" and in the mid 1960s Project Reach High was used by the school system.

Currently, the school system capacity to achieve further use of its mainframe computer for education and other purposes is hampered only by available personnel to conduct this further usage. Programs of vital importance and justification are business centered and a system of this size could hardly do without such technology. The Business Department and its computer staff have provided an extensive and challenging organizational structure to modern business methods. These departments should be commended in their expertise and farsighted approach to such a task.

Educational use of this technology has been made available through coordinated effort to administrative and instructional coordinators for development and use in grading, testing, test analysis, scheduling and other programs. The system has the

personnel, the talent and the ability, with additional personnel, to provide services in instruction far into the school system future. Such technology could be used on a greater scale in the future.

Major Goals for Computing*

Goals:

1. To formulate a system-wide computer plan for classroom computing.
2. To make classroom computers available to all students.
3. To provide inservice for teaching and administrative personnel.
4. To develop software review procedures for classroom computer materials.
5. To centralize and coordinate classroom computing in the system.
6. To help students at all grade levels develop computer related awareness and career skills.
7. To provide all students including gifted, talented, and exceptional a means for expression and creativity and exploration in using the computer.
8. To help students and teachers meet the challenge of basic skills.
9. To provide current and future technology for education and instruction to classroom teachers.
10. To provide computer literacy skills for teachers, administrators and students.
11. To provide classroom computer management programs.
12. To provide classroom individualization for students.
13. To develop a sequential instructional program using integrated computer programs and instructional materials in the classroom.

*See System-Wide Computing Plan, Fall to June 1983-1988.

METHODS FOR ACHIEVEMENT OF
SYSTEM-WIDE COMPUTING PLAN
Fall to June 1983-1988

Statement of Goals	Statement of Objectives	Methods of Achievement	Completion Date
1. To formulate a system-wide computer plan for classroom computing	1. A plan will be developed concerning classroom computing in the school system to project present and future computer needs for the education of students, teachers, and administrators.	A. Committee will be developed to formulate computing plan	December, 1982
		B. The committee will be composed of administrators, instructional coordinators and teachers	December, 1982
		C. Appoint committee members	December, 1982
		D. Meeting and structuring of committee work	January, 1983
		E. Assignment of subcommittees	January, 1983
		a. Subcommittee meetings	
		b. Subcommittee reports	Jan., Feb., March, and April, 1983
		F. Completion of all subcommittees	March, 1983
		G. Completion of all main committee work	April, 1983
		H. Present plan to administrative staff and Board of Education for adoption	April, 1983
2. To make classroom computers available to all students	1. Purchase of classroom computers for grade levels on all school sites	A. Develop fund plan whereby computers could be purchased with local, state and federal funds. Also, through P.T.A.s, business, and industry	Fall, 1988
3. To provide inservice for teaching and administrative personnel	1. Teachers and administrative personnel will be given instruction on the operation and use of classroom computers.	A. Inservice will be held for all principals and 3 teachers from all schools.	February, 1983
		B. Inservices will be beginning, intermediate, and advanced for classroom computer use.	Feb., 1983-June, 1988 (Based on attendance and interest)
		C. Beginning introduction to computing	Feb., March, July and Oct., 1983
		D. Intermediate use of computer	November, 1983
		E. Developmental techniques for reviewing software for classroom computers	Oct., 1983
		F. Continued ongoing inservice for teachers in computing through C-MCS inservice book	Jan., 1984 June, 1988

METHODS FOR ACHIEVEMENT OF
SYSTEM-WIDE COMPUTING PLAN
Fall to June 1983-1988

Statement of Goals	Statement of Objectives	Methods of Achievement	Completion Date
4. To develop software review procedures for classroom computer materials	1. The committee on computers will develop a plan for reviewing software system-wide.	A. Committee will adopt the Software Review Subcommittee's recommendation for review of software system-wide.	March, 1983
	2. Teachers will receive inservice on how to select computer software materials for educational programs.	A. System-wide software review committees will be appointed in areas of language arts, math and science, social studies, business, and others by levels of K-5; 6-8; 9-10; vocational; special education, language, art and music.	October, 1983
		B. Inservice for review committees will be held to instruct on how to evaluate software	October, 1983 Inservices to be ongoing into 1986
5. To centralize and coordinate classroom computing in the system	1. The school system will designate a coordinating person to head the classroom computer program.	A. Selection of chairman for computer curriculum committee to guide overall plan development	November, 1982
		B. Development of full-time position for computer programs at the instructional level to coordinate overall system-wide program (Funding could be through federal, state, and local).	August, 1985
6. To help students at all grade levels develop computer related awareness and career skills	1. Development of curriculum instruction units at each grade level that will prepare students for computer awareness and career skills	A. Unit development through teacher appointed representatives as grade level members to develop awareness instruction units K-12	Ongoing process, Sept., 1983 to 1988
		B. Unit development in career skills and opportunities - Grades 4-12	Ongoing process Sept., 1983 to 1988
		C. Unit development in literacy and awareness of computers K-12 with emphasis on literacy in grades 7-8, instructional units at K-6 extending for 1 week, and 7-8 for 2 weeks, and 9-12 one week.	Ongoing process, Sept., 1983 to 1988

METHODS FOR ACHIEVEMENT OF
SYSTEM-WIDE COMPUTING PLAN
Fall to June 1983-1988

Statement of Goals	Statement of Objectives	Methods of Achievement	Completion Date
7. To provide all students including gifted, talented, and exceptional a means for expression and creativity and exploration in using the computer	1. Students will be given the opportunity in school and out of school to explore at a personal level the use of the computer.	A. Making all classroom computers available to the student population from a major point of open access (placement of computers in libraries or media centers if computers are in numbers.	September, 1983 and ongoing
		B. Providing computer access to students on an individual study basis in the classroom for independent work	September, 1983 and ongoing
		C. Allowing students structured time to explore the individual use of the computer in a non-structured curriculum activity	September, 1983 and ongoing
		D. Providing means whereby students will be encouraged to check out computers or have available after school activity time so students can explore on their own the use of the computer. (Checking out of computers from site would require parent or guardian insurance policy in case of abuse or misuse) similar to drivers' education.	Fall, 1984 and ongoing
		E. Providing parent and student activity nights at school sites for families to explore knowledge and use of the computer	Fall, 1984 and ongoinc
8. To help students and teachers meet the challenge of basic skills	1. Development of unit correlation with state basic skills program	A. Units relating to basic skills should be correlated to state skills program through teacher units and prepared state basic skills curriculum. Program should be expandable in the necessary grades as the curriculum is developed and/or mandated by the State.	Fall, 1985

METHODS FOR ACHIEVEMENT OF
SYSTEM-WIDE COMPUTING PLAN
Fall to June 1983-1988

Statement of Goals	Statement of Objectives	Methods of Achievement	Completion Date
9. To provide current and future technology for education and instruction to classroom teachers	1. Purchase of computers for the instructional use of the classroom teacher and ongoing curriculum program	A. Placement of classroom computers at grade levels or easy overall building level use in the school	Spring, 1983 and ongoing
	2. To help teaching staff become aware and involved in using computers in their classrooms on an instructional basis	A. Encouraging classroom teachers in the incorporation into unit development, use by students, development of inovative instruction usage of computers in the curriculum through inservices, workshops, unit development	Fall, 1983
10. To provide computer literacy skills for teachers, administrators and students	1. Inservices and staff development workshops will be held for teachers and administrators	A. Inservice for teachers and administrators will be held to develop literacy skills in the use of the computer	Spring, 1983 to 1984
		B. Staff development workshops will range from beginning computer usage to advanced usage	Fall, 1984 - 1988
	2. Development of computer literacy skills for students	A. Classroom units developed by teachers will implement literacy skills for students (unit development through inservice)	Fall of 1984 and ongoing
		B. Unit instruction in the classroom	Spring of 1984 and ongoing
11. To provide classroom computer management programs	1. Classroom management program will be provided for teachers to show student development, progress, competency in skills and grade level growth in subject matter.	A. Adoption of classroom management system for classroom teachers that relate to courses and subjects taught at each grade level. (Ex. STAMM, Basic Skills, Reading, Math, Social Studies, etc.)	Spring 1984
12. To provide classroom individualization for students	1. Students will be encouraged to use computers for individualized classroom work.	A. Encouragement by teachers to have students use computers for individualized classroom projects	Fall, 1983
		B. Encouragement of teachers to make assignments and unit development in their classrooms for student work with computers.	Fall, 1983

METHODS FOR ACHIEVEMENT OF
SYSTEM-WIDE COMPUTING PLAN
Fall to June 1983-1988

Statement of Goals	Statement of Objectives	Methods of Achievement	Completion Date
13. To develop a sequential instructional program using integrated computer programs and instructional materials in the classroom	1. The School System will develop a sequential curriculum to integrate the use of computers into the currently approved instructional programs and adopted materials.	A. Incorporate computer use into course outlines or upgrade course outlines	Fall of 1984
		B. Encourage instructors to incorporate computer use in classroom units based on course outlines and prospectus	Ongoing
		C. Mark points in K-12 curriculum where computers and related support materials can be naturally integrated within the present curriculum.	Ongoing
		D. Provide for a system-wide plan and outline staff development plan to assist teachers in accomplishing the above task.	Ongoing

OVERVIEW OF COMPUTER RELATED USE IN THE SCHOOL SYSTEM

Microcomputers and their related courseware can support the following approaches to computing in the school system. These approaches can be divided into:

I. Instruction Development
II. Curriculum Development
III. Teacher/Administrative Management

I. Instruction Development

A. Individualized instruction

B. Remedial instruction

C. Diagnosis

D. Motivation

E. Personal interaction (two-way)

F. Drill and practice

G. Basic information

H. Feedback on student performance (reinforcement)

I. Computer Assisted Instruction

J. Problem solving/logical thinking skills

II. Curriculum Development

A. Resource Information File - a district or county system-wide file containing papers, books, materials, tapes, films, etc. related to the curriculum

B. Production - of instructional materials from a central file

C. Computer awareness and literacy

D. Computer Science

E. Vocational counseling

III. Teacher/Administrative Management

A. Computer Managed Instruction

1. Organize curricula and data
2. Monitor student progress
3. Diagnosing, prescribing, testing, and evaluating
4. Provide planning information

B. Record keeping

1. Enrollment
2. Statistics
3. Scheduling
4. Student attendance
5. Grades
6. Testing
7. Analysis

C. Communications

D. Word processing

E. Inventory management

F. Bookkeeping process

G. Timetabling

H. Library applications

1. Inter-library loan
2. Inventory
3. Circulation

I. Networking

LEGAL ISSUES CONCERNING COMPUTING IN THE SCHOOL SYSTEM

Statement of Philosophy:

The Clarksville-Montgomery County School System respects the property rights and laws respecting copyright holders of computing software. It is the intention of the school system that these legal rights be respected by the personnel of the school system.

Policy Recommendations:

1. Clarksville-Montgomery County employees and students do not have permission to copy, redistribute or sell any computer software purchased by the school system except where written permission is granted by the company or creator of the software and/or where the copyright laws allow for such personal archival copies intended as backup protection by law.

SOFTWARE COPYRIGHT

WARNING: Subject to the provisions of the copyright act of 1980, as specified in Public Law 94-553, dated 12 December, 1980 (94 STAT. 3028-29) and amended as Public Law 96-517, the duplication of computer programs without prior consent of the publisher, for the purpose of barter, trade, sale, or exchange is a criminal offense, for which the offender maybe subject to fine, imprisonment, and/or civil suit. Under the provisions of Section 117 of Public Law 96-517 it is not an infringement for the owner of a computer program to make or authorize the making of another copy or adaptation of that computer program provided that such new copy or adaptation is created for archival purposes only and that all archival copies are destroyed in the event that continued possession of the computer program should cease to be rightful.

2. Clarksville-Montgomery County employees and students who create software programs using school system computer equipment and/or software will hold joint copyright with the school system. The school system will have 25% ownership of any marketable programs.

SOFTWARE REVIEW AND EVALUATION

PHILOSOPHY

We believe that every child should have the opportunity to become computer literate, and also have access to the best available software that can be incorporated into our curriculum.

In order to have computer software that is educationally sound and for all schools to have an equal opportunity to use the software, there should ideally be one person to head the software evaluation program.

There should be system-wide review of all software bought, whether it is bought with system funds or from other sources. The software should be educationally centered and sound, capable of being used in the regular curriculum of the school system. A review committee will serve to accomplish this goal.

All software should:

1. Be reviewed by designated committee.
2. Be educationally sound.
3. Be readily accessible.
4. Meet the criteria of "good teaching."

SOFTWARE EVALUATION CRITERIA

M. Tim Grady

Teachers are being asked to evaluate microcomputer instructional software. This article serves as suggested guidelines for teachers and curriculum staff to follow as they work in this area.

Two general parts are present in the evaluation. The first is simply the demographics of the intended use of the programs. The second is the performance criteria or "quality" aspect of the software.

The demographics can be charted on a 5 x 8 card, notebook insert, or similar format. Some instructional planners use a computerized data storage and retrieval scheme for their software. The areas that should be included are:

1. Objective(s)
2. Subject/Topic
3. Grade/Age Level
4. Level of Difficulty
5. Prerequisites
    a. Skills
    b. Other software
6. Hardware requirements
    a. Brand name
    b. Memory requirements
    c. Operating system
    d. Peripherals
7. Support materials required

Once the demographics have been written down, cross-referenced across main categories, and placed into a data retrieval or card catalog system, teachers will be able to find the programs they need to assist with the objectives their students are working on.

The performance criteria are the true evaluation for the software. Each will be presented here as a category or a question. Some teachers will want to translate them into rating scales; others into brief comments. In either case, the user of these criteria will be holding the software up to close scrutiny.

Criteria 1: Directions. Good software programs are self directing. The directions should be optional at the user request and should be available upon request for the user. Directions should include worked examples and should take the user through a sample activity.

Criteria 2: Instructional Organization. The way to look at instructional organization is to look at the software the same way we look at good teaching. In the classroom, we look at how materials are introduced, how appropriate the examples are, use of exercises and formative evaluation, sequencing, correctness of examples and facts, length of a lesson, and flexibility. Good educational software "acts like" good teaching. As teachers we try to be sensitive to our students' needs with regard to alternate examples, reteaching, and review. In computerized courseware we call that "branching."

Branching should be evaluated. If a bright student is proceeding rapidly through the material, the program should skip ahead to a new section or another objective. If a student is

struggling and missing all of the formative evaluation items, then that student's instruction should be switched and some sort of diagnosis performed. As we look at software, we need to evaluate the branching capabilities.

Criteria 3: Consistency. Good instructional software, like good teaching, is consistent. The screen layouts should be consistent throughout. The screens should also be uncluttered and self explanatory. Question format and requests for input should be displayed in a consistent manner. If they are not, we may be putting a student through a screen deciphering exercise instead of a math or science lesson. Keystroke requests should be consistent. If some questions require the student to hit 'return' or 'enter' while other questions require only a single keystroke, students may become confused. Some software will accidentally generate wrong responses if an 'extra' return is encountered while others will stop altogether. Teachers should be sensitive to keyboard inconsistencies and include them in their evaluation.

Criteria 4: Help Functions. Who has ever heard of a class where the students can't ask for an explanation or a book where the pages can't be flipped in reverse order. All good software has a built in help library available for the student when needed. Tutorials should be built in so that the help is not merely a glossary of terms or directions.

Criteria 5: Error Handling. Users of programs will make accidental errors. Some, such as an unneeded return, have potentially disasterous results. Others, such as type 'yes'

instead of 'y' or visa versa should be handled by the software. Kids like to put in extra spaces either before or after the words. Good educational software always accommodates extra spaces. When upper and lower case can be treated equally, they should.

Accidental 'breaks' or 'resets' should be trapped and ignored. Unreasonable responses, such as '10000' in response to how many spelling words should be tried, ought to be trapped and disallowed. Many younger students like to hold keys down for an inordinately long time. This error should be accounted for and the results ignored. Superior courseware protects a program's data during an accidental crash thereby allowing a restart for the students.

Criteria 6: Reactions to wrong student response. When a student misunderstands or when he is not following directions, good teachers sense this and alter their teaching strategy. Good computer programs do the same.

Summary

These six performance criteria are intended to help teachers and others to critically evaluate educational software. In all cases, the overriding criteria should be: Does this courseware behave according to the behavior of good teaching.

SOFTWARE EVALUATION FORM*

Reviewer's Name: _____

School: _____

Subject Area: _____

Date of Review: _____

Part I: Program Descriptors

1. Title _____

_____

2. Brief Description:

_____

_____

_____

_____

3. Length (mins.) _____

4. Computer _____

5. Memory/O-S _____

6. Format--Type/Disk _____

7. Support Material:

_____

_____

_____

8. Subject _____

9. Topic _____

10. Grade _____

11. Level of Difficulty:

H M L

12. Objective(s):

_____

_____

_____

_____

_____

13. Prerequisites:

_____

_____

_____

14. Comments:

_____

_____

_____

*Software evaluation form developed by Dr. Tim Grady and is being used with his permission.

Part II: Instructional Application

5 = Always appropriate

1 = Never appropriate

	CIRCLE ONE
1. Drill and practice	1 2 3 4 5 NA
2. Skill maintenance	1 2 3 4 5 NA
3. Review of facts	1 2 3 4 5 NA
4. Tutorial	1 2 3 4 5 NA
5. Concept introduction	1 2 3 4 5 NA
6. Concept reinforcement	1 2 3 4 5 NA
7. Small group activity	1 2 3 4 5 NA
8. Large group/class activity	1 2 3 4 5 NA
9. Simulation	1 2 3 4 5 NA
10. Experiment/Demonstration	1 2 3 4 5 NA
11. Data manager	1 2 3 4 5 NA

Comments:

Part III: Presentation Quality

5 = Outstanding

1 = Poor

		CIRCLE ONE					
1.	Screen Layouts	1	2	3	4	5	
2.	Consistency of formats	1	2	3	4	5	
3.	Content accuracy	1	2	3	4	5	
4.	Directions	1	2	3	4	5	
5.	Clarity of format/question	1	2	3	4	5	
6.	Length	1	2	3	4	5	
7.	Use of graphics	1	2	3	4	5	NA
8.	Use of sound	1	2	3	4	5	NA
9.	Error trapping	1	2	3	4	5	

Comments:

_____

_____

_____

Part IV: Instructional Quality

5 = Outstanding

1 = Poor

0 = Does not exist

		CIRCLE ONE					
1.	Appropriateness of content		1	2	3	4	5
2.	Appropriateness of examples		1	2	3	4	5
3.	Appropriate level of difficulty		1	2	3	4	5
4.	Sequencing of examples/questions		1	2	3	4	5
5.	Help Functions	0	1	2	3	4	5
6.	Use of formative evaluation	0	1	2	3	4	5
7.	Branching	0	1	2	3	4	5
8.	Quality of test items	0	1	2	3	4	5
9.	Number of items/questions		1	2	3	4	5
10.	Use of review	0	1	2	3	4	5
11.	Introduction	0	1	2	3	4	5

Comments:

SOFTWARE REVIEW PROCEDURES

The reviewing of software in the Clarksville-Montgomery County School System will be handled in the following recommendations:

1. The media service personnel in each school will be designated as the contact person by the principal concerning software.

2. The principal will on an equal and rotating basis appoint other personnel in the school to meet with the media specialist for review needed, and approve subject and grade level computer software programs.

3. Each media specialist will insure that software is reviewed and evaluated. All evaluations will be conducted on the adopted review form by each reviewer and scores will be compiled by the media specialist in each school.

4. After each building review, all evaluation forms and software packages will be returned to the Central Office designated computer program coordinator. The software package and new evaluation forms will then be sent to another school where additional review may be conducted.

5. All school level reviews will be reviewed by the Software Evaluation Committee. This committee will select, based on appropriate evaluation scores, software programs that each school may purchase and make recommendations to the system-wide computer committee correspondent.

6. Software for computer use should be circulated through a centralized location in the school system. This should apply to centrally purchased software and individual school purchase program. Such a centralization of software holdings would down size the software cost to the school system and individual schools in the system. The program would function as a lending library.

7. All software reviews should be placed in the mainframe computer for access by individual schools in order for them to determine if the programs under consideration meet their needs and to prevent duplication of programs.

STANDARDIZATION OF COMPUTER HARDWARE

Statement:

The committee recognizes that the current field of microcomputing and accompanying hardware is large and continues to expand on a monthly basis. The committee also understands that such an expanding market necessitates the adoption of a system-wide microcomputing standard in relation to hardware to ongoing curriculum needs.

The committee makes the following recommendations:

1. All school computer equipment requests for purchases will be reviewed by the Equipment Review Committee and recommendation will be made to the system-wide committee.

2. The computer must meet the needs of the instructional program of the school.

3. The computer should be manufactured by a reliable, recognized company.

4. The computer should support the best educational quality programs and provide a large variety of available current and future programs and hardware.

5. The computer should have a reliable maintenance and repair record, and be repairable at local level if possible.

6. The computer should be expandable in memory; support additional equipment such as printers, card scanners, cards for converting forty to eighty columns; and be able to support additional languages such as Logo, Pascal, Cobal, and Fortran.

7. Computers in the school system should be standardized in order to take advantage of circulating software throughout the system.

CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS
CURRENT STATUS AND PRESENT SYSTEM SITE LOCATION OF MICROCOMPUTERS
1982-1983

Present System Site Status for Microcomputers	1982-83 Current Funded Computers					1981 Prev. Funded Computers				GRAND TOTAL
	Ch. 1	Ch. 2	Sp. Ed.	Other	Total	G.P.	Sp. Ed.	Other	Total	
I. Elementary										
Barksdale		1								
Burt		1								
Central Elem.		1								
Cumb. Hgts.	2	1								
Darden		1								
E. Montgomery		1								
Moore		1								
Ringgold		1								
Smith		1								
St. Bethlehem		1								
Woodlawn		1								
Totals	2	11			13					13
II. Middle Schools										
Greenwood		2								
N. P. Middle		2								
Richview		2		1						
M. C. Middle	0		1	0	0					
Totals		6	1	1	8					8
III. High Schools										
Clarksville High			1				1	2*		
M. C. H. S.							1			
Northeast High	0	0	0	0	0	1	1			
Northwest High			1				1			
Totals			2		2	1	4	2	7	9
IV. Other Locations										
Central Office	1	3	2							
Teacher Center								1		
Vocational*								1#		
#								11*		
Totals	1	3	2		6			13	13	19
V. Other/Spec.										
Back up			3				2			
Totals			3		3		2		2	5
GRAND TOTALS	3	20	8	1	32	1	6	15	22	54

*TRS-80S
#Wang

TOTAL COMPUTERS BY FUNDING SOURCE

1981 and Prior Funding:		
1.	G. P. Funds	1
2.	Special Education	6
3.	Vocational/State	14
4.	Teachers' Center Grant	1
	Total	22
1982 Present Funding:		
1.	G. P. Funds	0
2.	Special Education	8
3.	Chapter 1	3
4.	Chapter 2	20
5.	Other	1
	Total	32
	GRAND TOTAL	54

INSERVICE AND STAFF DEVELOPMENT

The committee recognizes the need for two approaches to inservice and staff development and makes the following recommendation. First, inservice has already been initiated for teachers concerning the computer and its use. This inservice was held in February and some seventy-six teachers, administrators, and coordinators attended. Inservice is also planned for the week of July 11, 1983 on a teacher selected basis and will be directed by Mrs. Pat Donahue from the Teachers' Center. Inservice is also scheduled for teacher selection in the fall relating to computer use and selection of software products.

Inservice classes are being planned by the State Department of Education for seventh and eighth grade teachers across the state of Tennessee. This plan to be implemented by the state if funds are available will be used to train these teachers for the governor's computer literacy program. Details have not been communicated to the local school level at this time.

Second, it is of great importance that a sound, flexible, and indepth staff development plan be developed in the school system relating to computers. The current state of computer technology requires a staff development plan if teachers are expected to implement any portion of a sound computer program for the system students. Staff development provides and answers problems that arise in preforming such inservice. The difference

being that inservice is not as comprehensive, not as well developed, provides little follow-up or reinforcement. Approaching the problem through staff development provides a long-term program containing well defined training strategies.

Staff development would allow for a well defined and structured program to target true teacher and administrative needs. It would target long-range goals and objectives; provide for structured course work; incorporate teacher and administrator created programs; and establish a sound cycle of evaluation procedures to test the effectiveness of the program.

The committee recommends that the concept of staff development be used, funds be provided; assessments be made on school system needs; and training be offered to the teachers and staff of the school system to meet the needs of the professional growth and development. The staff development approach would be the proper method to train system-wide personnel for the use of the computer, whether it is micro or mainframe computing.

COMMUNITY INVOLVEMENT IN SCHOOL COMPUTING

The Committee recognizes the interest and concerns of the public in relation to computing in the schools. Parents, students, and the business community should be encouraged into the schools' computing concepts. Based upon such interest the committee makes the following recommendations:

1. Organizations such as the PTA, PTO, and other parent groups located in individual schools and the system as a whole, should be encouraged to purchase hardware and software for classroom computing. Such purchases would be compatible with equipment standards and software would require a review process. In this manner parents and parent organizations could help provide needed items in computing at their individual schools.

2. Industry, business and professional organizations should be encouraged to participate in an "Adopt a School Program." This type of program would allow leaders in the community to share their financial resources and knowledge concerning computing. Funding should be encouraged from these leaders to help provide a school or schools with computer technology both in hardware and software.

3. Students and teachers should be encouraged to participate in computer programs at the school level. Such participation could involve computer clubs, monthly newsletters, computer program and problem solving content. Students who have knowledge and use of computers at home should be encouraged to share such knowledge with teachers and fellow students.

4. The Board of Education and the administrative staff should explore options that are available to incorporate personal computers in students' homes into the school system's mainframe computers.

   The mainframe computer could contain a variety of data bases that meet student needs. These data bases could be attendance, grade reporting, homework assignments, and creative courses in computing. Students and parents could

be allowed to access these data bases to retrieve information concerning the items already mentioned. Public school systems in other states have already initiated such programs and report they are working satisfactorily.

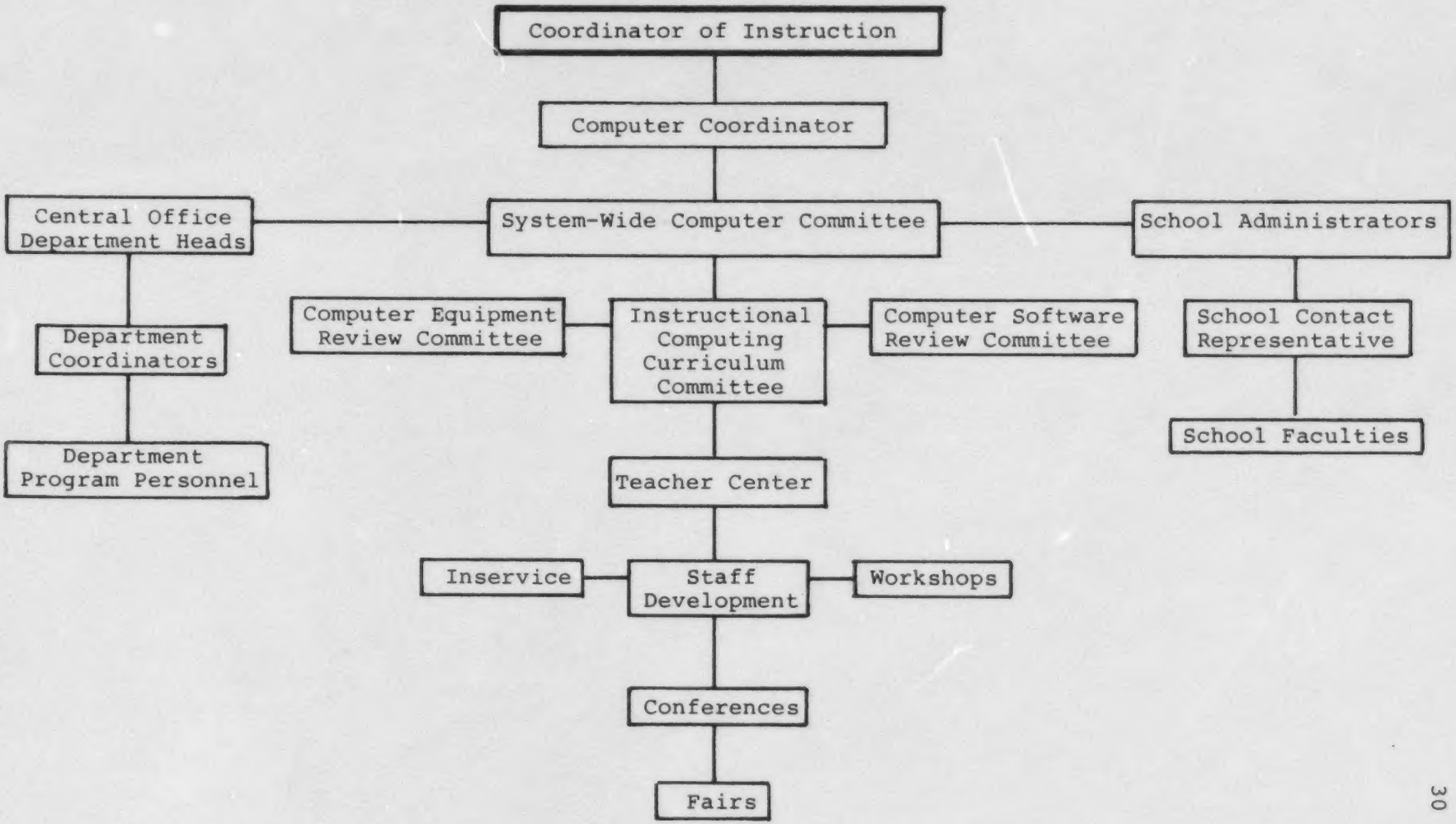
5. A computer "clearing house" for information concerning hardware needs, software evaluation, prices and related education materials should be established. Access to such a data base should be on a subscription basis. Parents, industry, business, surrounding educational instructors as well as school systems in the area could retrieve current and timely information relating to computers.

6. An annual "Community Computer Educational Conference" should be established. This program would provide parents, teachers, students and community leaders with current concepts and ideals relating to computing. Visiting speakers could address the community on problems of software in business, education, as well as up-date teachnology changes in both microcomputing and mainframe computing. Such a community educational approach should also contain a "fair" for active community involvement.

7. Courses concerning computer literacy and the updating of skills should be provided for the community. Interested students and adults could attend to learn about computing and computing applications. Such a program could be established for the summer and operate on a "fee basis."

CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS

ORGANIZATIONAL CHART FOR MICROCOMPUTING*



*NOTE: Explanation of Line Chart on the following pages.

ORGANIZATIONAL CHART FOR MICROCOMPUTING MANAGEMENT

The committee understands the need for well defined lines of communication in dealing with microcomputers in the schools. It is important that a system for handling communications properly be delineated in the proposed plan.

For microcomputing to achieve a sound educational foundation in the school system it is important that specific committees be developed to handle foreseeable future concerns.

The following recommendations are presented by the committee as a means of alleviating problems which might arise from a general lack of knowledge concerning computing. The following committees are proposed:

1. System-Wide Computer Committee

   This committee would be composed of the following members:

   a. Classroom teachers
   b. Principals, one each from the elementary, middle school and high school
   c. Coordinators from the Central Office in instruction
   d. Person from the mainframe computer department located at the Board of Education, the manager

All members of this committee should have a background or familiarity with computers for school instruction and management.

This committee will forward to the Instruction Computer Committee concerns dealing with equipment, software, instruction and staff development.

2. Instructional Computer Subcommittee

   This committee will be composed of the following members:

a. One member from the Teacher Center, its director, to act as chairman
b. One Central Office coordinator in instruction
c. One elementary principal
d. One secondary principal, either high school or middle
e. Three classroom teachers from high, middle, elementary

This committee will act upon request from the System-Wide Committee and will forward appropriate requests to either the Computer Equipment Committee or the Computer Software Review Committee. Activity dealing with inservice, staff development, conferences, workshops, and/or fairs will be acted upon by the Instructional Computer Committee body.

3. Computer Software Review Subcommittee

This committee will be composed of the following members:

a. Two coordinators in instruction
b. Two principals, one elementary, one secondary
3. Three classroom teachers, with the chairman being one of the teachers

This committee will act upon request for software and reviews, compiling reviews, printing reviews, and based upon reviews make recommendations for system use of software for the classroom computing program. All requests acted upon will be sent to the Instructional Computing Committee for action and then to the System-Wide Computer Committee.

4. Computer Equipment Review Subcommittee

This committee will be composed of the following members:

a. One coordinator in instruction
b. One principal, either elementary, middle or high school
c. Two classroom teachers, elementary, middle or high school
d. One mainframe computer manager, who will act as chairman

This committee will act upon equipment requests and review system-wide needs. The committee will make recommendations for microcomputer hardware, language, memory size, and peripheral computer equipment. This committee will function to provide system compatibility and/or maintain needed system changes to meet the changing technology.

All committees listed will take action and make recommendations back through their parent committee who will provide action and return to the System-Wide Computer Committee. The System-Wide Computer Committee will act upon request and recommendation and forward these to the computer coordinator or if such a person is not a part of the system, then to the Coordinator of Instruction's Office.

This form of charting of duties and responsibilities will provide the system with a safeguard to help insure the school system against software and hardware products that are not educationally sound and do not meet the appropriate instructional area for which they are intended.

CLARKSVILLE-MONTGOMERY COUNTY SCHOOL SYSTEM

COMPUTER CURRICULUM

Grades K-12 and Administrative

The following items address application and instructional goals for using computers in the school system by grade groups. Committee recommendations are listed below:

1. The attached instructional goals and curriculum plan should be pursued in the school system for classroom computing.

2. Serious attention should be given to the purchase of hardware for each administrative school building office as presented in the mainframe computing sheet. This would provide available technology, information, and data bases available to all schools and administrative offices and departments.

3. A full-time coordinator of instructional computing should be employed to manage, structure a sound curriculum, and coordinate inservice and staff development training programs.

*Computer ratios are 1 to 100 students based upon 4th reporting period for 1982-83 term

CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS
COMPUTER EDUCATION PROGRAM
GRADES K TO 3

MAJOR INSTRUCTIONAL GOALS (A)	HARDWARE REQUIREMENTS (B, C, D)	LOCATION OR HARDWARE (E, F)	STAFF DEVELOPMENT NEEDS (G)	SOFTWARE SUPPORT (H)	FUNDING FEDERAL	FUNDING STATE	FUNDING LOCAL	TARGET DATE FEA	TARGET DATE SEA	TARGET DATE LEA
Introduction to Computers K-3 1. Keyboard familiarity 2. Introduction to operation of computer 3. Introduction to limited computer vocabulary 4. Hands on student use a. Switching on b. Running program disk c. Operating program and interactions 5. Using computer lesson or courseware a. Computer Assisted Instruction (CAI) b. Computer Managed Instruction (CMI) c. Reading, math, writing, motor skills, State Basic Skills first 6. Individual and teacher directed usage a. Remediation b. Reinforcement c. Exploration d. Enrichment f. Individualized student use	44 Computer units each consisting of the following components: Computer Color Monitor Disk Drive and Controller Per unit cost $2,000 C Additional Peripheral Equipment (State Basic Skills Equipment) 1 Unit for each K-3 Elem. School Card Reader 132 Column Printer 2nd Drive Per unit cost $2,600 @ 10 units D Additional Drives 1 per computer unit Total of 34 Per unit cost of $350	Site location should be central or have shared grades in grade levels Barksdale 3 Central 4 C. Hgts. 2 Darden 8 E. Montg. 4 Moore 4 Ringgold 6 Smith 3 St. Beth. 5 Woodlawn 5 Total Units 44 F Basic skills equipment to be used for CMI and shared by building teachers K-3 grades	Staff development needs would entail training of teachers for equipment use, software selection and review, use of CAI and CMI programs. Additional staff programs would require unit development integration of standard curriculum, study guide development and intermediate and advanced teacher usage of equipment. Inservice would be promoted through building level and system-wide inservice book. Cost projected at $50.00 per grade level grades K-3 for all 10 elementary schools.	Software support needs figured at $200 per computer unit. Cost would be for CAI programs, blank disks, printer paper and card reader forms.	-0- B -0- C -0- D -0- G -0- H	-0- -0- -0- -0- -0-	$88,000 26,000 11,900 2,000 8,800	NA	NA	June 1988 June 1988 Fall 1985 Fall 1985
				TOTAL COST K-3 GRADES			$136,700	NA	Fall 1985	June 1988

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* Computer ratios are 1 to 100 students based upon 4th reporting period for 1982-83 term

CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS
COMPUTER EDUCATION PROGRAM
GRADES 4 TO 6

A MAJOR INSTRUCTIONAL GOALS	B HARDWARE REQUIREMENTS	E LOCATION OR HARDWARE	G STAFF DEVELOPMENT NEEDS	H SOFTWARE SUPPORT	FUNDING FEDERAL	FUNDING STATE	FUNDING LOCAL	TARGET DATE FEA	TARGET DATE SEA	TARGET DATE LEA
Introduction and Reinforcement to the Use and Operation of the Computer 1. Reinforcement a. Extended vocabulary b. Operation of computer c. Hands on for students d. Continued keyboard and command usage e. Skill development f. Introduction into basic computer languages 2. Remediation in courses a. Reading, language arts b. Math c. Science d. Social Studies 3. Other exploratory and classroom usage a. Problem solving b. Simulation c. Logical thinking skills d. Exploration e. Creativity f. Basic programming graphic and sound use 4. Courseware or lessonware programs use for CAI and teacher CMI a. Testing and scoring b. Drill, practice c. Record keeping d. Individualized student use e. Classroom management	33 Computer units each consisting of the following components: Computer Color Monitor Disk Drive and Controller Per unit cost $2,000 C Additional Peripheral Equipment (State Basic Skills) Card Reader 132 Column Printer 2nd Disk Drive 1 unit for each 4-6 Elem. and Middle School Total unit cost $2,600 @ 13 units D Additional Drives 1 per computer Total 20 Per unit cost $350	Site location could be centralized or have grade sharing by grade levels. Barksdale 2 Burt 1 Central 1 C. Hgts. 2 Darden 1 E. Montg. 2 Moore 1 Ringgold 1 Smith 2 Woodlawn 2 Greenwood 2 N.P. Middle 4 Richview 4 Total Units 33 F Basic skills equipment to be used for CMI by building teachers 4-6	Staff development needs would entail training of teachers for equipment use, software selection and review, use of CAI and CMI programs. Additional staff programs would require unit development integration of standard curriculum, study guide development and intermediate and advanced teacher usage of equipment. Inservice would be promoted through building level and system-wide inservice book. Cost figured at $50.00 per grade level in grades 4-6 for 13 schools (Elem. and Middle) with 4, 5, and/or 6th grades. TOTAL COST	Software support needs figured at $200 per computer unit. Cost would be for CAI programs, blank disks, printer paper and card reader forms. 4-6 GRADES	-0- -0- -0-	-0- -0- -0-	B 66,000 C 33,800 D 7,000 G 1,950 H 6,600 $115,350	NA NA NA NA	NA Fall 1985 NA NA	June 1988 June 1988 June 1988 Fall 1985 June 1988 June 1988

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*State computer program 2/3 projected funding by State Board. Based on SEA document.

CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS
COMPUTER EDUCATION PROGRAM
GRADES 7 TO 8

(GOVERNOR'S PROPOSED STATE COMPUTER LITERACY PLAN)

A MAJOR INSTRUCTIONAL GOALS	B HARDWARE REQUIREMENTS	D LOCATION OR HARDWARE	E STAFF DEVELOPMENT NEEDS	F SOFTWARE SUPPORT	FUNDING FEDERAL	FUNDING STATE	FUNDING LOCAL	TARGET DATE FEA	TARGET DATE SEA	TARGET DATE LEA
Computer Literacy (SEA) I. Governor's State Plan 7-8 Grades a. SEA plan would handle all 7th and 8th students over a 2-year period b. Cover literacy program as 1. History 2. Aspects of computing 3. Generation of computers 4. Component identification 5. Operating systems 6. Management information 7. Specific model identification c. Use of computers in daily life d. Use of computers in school e. Software and computer usage f. Algorithms for task performance g. Flowcharting h. Statements, commands in basic and logo i. Additional language exploration j. Career awareness and computers k. Vocabulary/terminology	State Computer Literacy Program 1 computer unit to 30 students Unit consists of computer, disk drive and controller, and color monitor. State would pay 2/3 of cost. Total units would be 69. Per unit cost $2,000 C The governor's plan does not call for any additional equipment for the operation of the program or student and teacher furniture or supplies.	State computer literacy program equipment to be located in labs at middle schools. Greenwood 12 New Prov. 25 M.C. Mid. 21 Richview 11 Total 69 2/3 of the 69 or 46 of these units would be funded by the SEA.	SEA plans call for only a two-day workshop for all 7th and 8th grade teachers. This program also calls for an across the board plan to train all teachers K-8 who will be dealing with the SEA Basic Skills first program. All other training would have to be the responsibility of the local school system.	This is unknown at the time and not mentioned in the SEA plan. However, the SEA does call for 6 software review sites across the state. Each site would specialize in a. Basic skills b. Administration c. Secondary curriculum d. Vocational education Presently the sites are not identified but the plan suggests they be colleges and may be large school systems.	-0- -0- -0-	B $92,000 E Unknown F Unknown	B $46,000 E Unknown -0-	NA NA NA	Dec. 1983 to Dec. 1984 Sept. 1983 to Dec. 1984 Fall 1984	Dec. 1984 NA NA at this time
	*For indepth look	at state plan	see Appendix A							
				TOTAL COST OF		SEA 7-8 PLAN				
						$92,000	$46,000	NA	1984	1984

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* Computer ratios are 1 to 100 students based upon 4th reporting period for 1982-83

CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS
COMPUTER EDUCATION PROGRAM
GRADES 7 TO 8

A MAJOR INSTRUCTIONAL GOALS	B HARDWARE REQUIREMENTS	E LOCATION OR HARDWARE	G STAFF DEVELOPMENT NEEDS	H SOFTWARE SUPPORT	FUNDING FEDERAL	FUNDING STATE	FUNDING LOCAL	TARGET DATE FEA	TARGET DATE SEA	TARGET DATE LEA
Instructional Use of the Computer 1. These topics would continue to build on K-3, 4-6 and SEA 7-8 Computer Literacy Program a. Identification of computer parts b. Extended vocabulary c. Extended computer functions 2. Instructional Use - Teachers and Students (CAI and CMI) a. Remediation b. Reinforcement c. Problem solving d. Logical thinking skills e. Simulation f. Word processing and writing in language arts g. Basic skills developmental reading h. Mathematics i. Science j. Art k. Social Studies 3. Career Awareness a. Related computer jobs b. Impact on job markets c. Exploratory on how technology is applicable to daily life, education, and business 4. Additional Use a. Exploration by students b. Individualized instruction c. Sound and graphics programs d. Use in humanities for creative writing and social issues	20 Computer units each consisting of the following components: Computer Color Monitor Disk Drive and Controller Per unit cost $2,000 C Additional peripheral Equipment (State Basic Skills) Card Reader 132 Column Printer 2 Drives Total unit cost $2,600 @ 2 units per grade level for 4 middle schools 7-8 grades D Additional Drives 1 per computer unit Total 4 Per unit cost of $350	Site location should be central and/or have grades and teachers share between rooms and grade levels Greenwood 4 New Prov. 7 Richview 6 M. C. 3 Total Units 20 These units would be regular program LEA use not connected with SEA Literacy Plan F Basic skills equipment to be used for CMI and shared by building teachers grades 7-8	Staff development needs would entail training of teachers for equipment use, software selection and review, use of CAI and CMI programs. Additional staff programs would require unit development integration of standard curriculum, study guide development and intermediate and advanced teacher usage of equipment. Inservice would be promoted through building level and system-wide inservice book. Cost projected at $100 per grade level in grades 7-8 for 4 middle schools with 7-8 grades	Software support needs figured at $200 per unit. Cost for CAI programs, blank disks, printer paper, and card reader forms	-0-	-0-	B 40,000	NA	NA	June
					-0-	-0-	C 41,600	NA	Fall 1985	June 1988
					-0-	-0-	D 1,400	NA	NA	June 1988
					-0-	-0-	G 800	NA	NA	June 1988
					-0-	-0-	H 4,000	NA	NA	June 1988
			TOTAL COST	7-8 GRADES			$87,800			June 1988

*Computer ratios are 1 to 100 students based upon 4th reporting period for 1982-83 term.

CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS
COMPUTER EDUCATION PROGRAM
GRADES 9 TO 12

A MAJOR INSTRUCTIONAL GOALS	B HARDWARE REQUIREMENTS	E LOCATION OR HARDWARE	G STAFF DEVELOPMENT NEEDS	H SOFTWARE SUPPORT	FUNDING FEDERAL	FUNDING STATE	FUNDING LOCAL	TARGET DATE FEA	TARGET DATE SEA	TARGET DATE LEA
Instructional Computer Use 9-12 1. Instructional Use: a. Remediation CAI-CMI b. Reinforcement CAI-CMI c. Subject matter use in English, reading, math, social sciences, science, business, vocational, health and physical education, art, music, journalism and language classes 2. Exploratory use could also extend to: a. Computer clubs b. Annual Staff c. Word processing d. Art and music e. Music programs and skills f. Advanced science and math programs g. Advanced business and career awareness programs h. Individual creative and exploratory time for advanced or interested students on their own and enrichment i. Advanced computer languages j. Creative writing k. Simulations and tutorial work 3. Career awareness and impact on society a. Social questions b. Public work styles c. The changing office work place d. Computer marketing e. Governmental and private abuse f. Customer rights g. Student protection h. Methods for marketing software	42 Computer units each consisting of the following components: Computer Color Monitor Disk Drive and Controller Per unit cost $2,000 C Additional equipment for extended and more indepth use and exploration 2 Printers per building per unit cost $800 1 Graphic table per building per unit cost $800 2 Green monitors per building per unit cost $200 D Additional Drives 1 per computer unit Total of 42 Per unit cost of $350	Item at this grade level could be departmentalized for specific use and shared by grade level instructors MCHS 6 CHS 13 NEHS 11 NWHS 12 Total 42 F Additional equipment listed in item (C) is needed so teachers and students will be allowed to explore the use of the computer far beyond the level of the K-8 programs. Students in 9-12 need the opportunity to develop further creative and practical use of the technology for school, independent and creative use.	Staff development needs would entail training of teachers for equipment use, software selection and review, use of CAI and CMI programs. Additional staff programs would require unit development integration of standard curriculum, study guide development and intermediate and advanced teacher usage of equipment. Inservice would be promoted through building level and system-wide inservice book. Cost projection at $100.00 per grade level in grades 9-12 for 4 high schools grades 9-12. TOTAL COST	Software support needs and supplies figured at $200 per unit. Cost would be more extensive at 9-12 due to experienced users and greater exploration of the computers.	-0-	-0-	B $ 84,000 C 11,200 D 14,700 G 1,600 H 8,400 $119,900	NA	NA	June 1988 June 1988 June 1988 June 1988 June 1988

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*Based on Dec. 4th reporting figures from Voc. Ed. Sect. 2/24/83

CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS
COMPUTER EDUCATION PROGRAM
VOCATIONAL TECHNICAL CENTER

A MAJOR INSTRUCTIONAL GOALS	B HARDWARE REQUIREMENTS	D LOCATION OR HARDWARE	E STAFF DEVELOPMENT NEEDS	F SOFTWARE SUPPORT	FUNDING FEDERAL	FUNDING STATE	FUNDING LOCAL	TARGET DATE FEA	TARGET DATE SEA	TARGET DATE LEA
Vocational Technical Center The instructional use of the computer could be at its highest level in vocational classes 1. Instructional use could be: a. Computer parts and functions 1. Electronics 2. Network block and diagram logic operations b. Graphic use, art, design, and printing c. Program basic and additional languages of Cobal, Fortran, Pascal and other d. Microcomputer maintenance and repair e. Business, work styles, changing office systems f. Design class for equipment design g. Industrial arts and drafting h. Word processing and secretarial skills i. Structuring of data base system j. System analysis for small equipment needs k. Software design and marketing l. Accounting 2. Career Awareness Training/Skills a. Computer skills for job search and employment b. Work style requirements c. Knowledge of data base system and small computers e. Knowledge of management systems f. Word processing and job resumes g. Computer employment awareness courses	5 Computer units each consisting of the following components: Computer Color Monitor Disk drive and Controller Per unit cost $2,000 C Additional Equipment 2 132 Column Printers @ $800 per unit 1 for computer program 1 for regular program 2 Graphic Tablets @ $750 per unit 1 for regular program 1 for computer lab 5 additional disk drives @ $350 per unit 3 for regular program 2 for computer lab Total cost $4,850	3 Computers and peripheral equipment to be located in regular program for instructors to use in classes or a teacher sharing and rotating basis. 2 Computers and peripheral equipment to be located in the computer laboratory for instructional use Voc. Tech. Center 5	Inservice would be in the manner as listed for all grades K-12. To take place through the inservice book plan. Cost figured at $5.00 per student for December memberships in 1982-83. It would be advisable to offer inservice on a wider level for these teachers since their students would generally be entering the work place early and more highly trained. Such inservice needs for teachers could be handled through educational, business, industry, collegiate, and community concern groups more generally familiar with work environment.	Software support and other needed materials figured at $200 per computer TOTAL COST			B $ 10,000 C 4,850 E 1,450 F 1,000 $17,300	NA NA NA NA	NA NA NA NA	June 1988 June 1988 June 1988 June 1988 June 1988

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Mainframe Program Equipment Needs for
Building Level Use:

MAINFRAME COMPUTER PROGRAMS
ALL GRADES K-12 & VOCATIONAL

Mainframe programs to support school building level administrative functions:

I. Instructional Programs:
Testing, grading, scoring; student data base on attendance, placement, ADA, membership, scheduling, age, sex, course loads, graduation credits, guidance and placement; processing testing; student drops and adds; special services handicapped census reporting; Chapter 1 educational deprivation data; comparability data; intersystem library loan system; student transfer data; vocational class load; system-wide class loads, class sizes and pupil/teacher ratios; library circulation, card catalogs and book orders; software review material evaluation printouts.

II. Personnel Programs:
Teacher data base composed of: substitute teachers, teacher certification; sick leave, annual leave, experience; job postings, transfers and applications for positions; budget planning teacher/student ratios and teacher building staff allocations.

III. Physical Plant/Facilities and Maintenance:
Inventory; Maintenance schedules; equipment transfers; custodial materials orders and custodial schedules; equipment maintenance, repair, theft, and discarded.

IV. Transportation:
Regulating buses, routing, schedules, students' addresses, Spec. Ed. transportation; personnel, trips, road hours, service and repair schedules, zone for shifting students from one school zone to another for required balance.

V. Food Service:
Free/reduced forms; students served; orders; and equipment phase in and out schedules

VI. Business:
Standard office functions that coincide with required purchasing, fund balances, p.o.'s, chart of accounts; ADA accounts, ISA accounts and special funds accounts, etc.

Hardware Requirements and Cost	
19 CRT's @ $1,600	$ 30,400
19 Printers @ $800	15,200
11 Modems for schools @ $635	6,985
11 Modems for Data Processing Department @ $570	6,270
8 Modems for schools @ $450	3,600
8 Modems for Data Processing Department @ $350	2,800
1 Rack @ $900*	900
1 Enclosure @ $1,120* (*) Data Processing to hold modems	1,120
4 Line Adapters @ $1,800 for mainframe	7,200
1 Education program for mainframe work and school programs for microsoftware programming	17,500
2 300 Band modems for education consortium hookup	500
Software needs for Educational Consortium/Clearing House modems	500
Total Cost	$ 92,975

Location

Equipment

Equipment location would be administrative complex at each school level building.

Personnel

Program would be located at Central Office Data Processing Complex.

Educational Consortium/Clearing House Program would operate out of Data Processing Complex in conjunction with Instructional Coordinator's office.

BUDGET FOR FIVE-YEAR COMPUTER PLAN

The following pages entail a budget explanation for the implementation and operation of this plan.

ESTIMATED BUDGET TO SUPPORT
FIVE-YEAR COMPUTER PLAN
CLARKSVILLE-MONTGOMERY COUNTY SCHOOLS

	1983-1984 COST				1984-1985 COST				1985-1986 COST				1986-1987 COST				1987-1988 COST			
	HARDWARE REQUIREMENTS CPU/UNITS	OTHER	SOFT WARE	STAFF DEV.	HARDWARE REQUIREMENTS CPU/UNITS	OTHER	SOFT WARE	STAFF DEV.	HARDWARE REQUIREMENTS CPU/UNITS	OTHER	SOFT WARE	STAFF DEV.	HARDWARE REQUIREMENTS CPU/UNITS	OTHER	SOFT WARE	STAFF DEV.	HARDWARE REQUIREMENTS CPU/UNITS	OTHER	SOFT WARE	STAFF DEV.
Elementary K-6	15 @ 2,000 = 30,000	Basic Skills 4 @ 2,600 = 10,400 Additional Drives 10 @ 350= 3,500	200 per CPU Unit = 3,000	790	15 Units @ 2,000 = 30,000	Basic Skills 4 @ 2,600 = 10,400 Additional Drives 11 @ 350 = 3,850	200 per CPU Unit for 3,000	790	15 @ 2,000 = 30,000	Basic Skills 5 @ 2,600 = 13,000 Additional Drives 11 @ 350 = 3,850	200 per CPU Unit for 3,000	790	16 @ 2,000 = 32,000	Basic Skills 5 @ 2,600 = 13,000 Additional Drives 11 @ 350 = 3,850	200 per CPU Unit for 3,200	790	16 @ 2,000 = 32,000	Basic Skills 5 @ 2,600 = 13,000 Additional Drives 11 @ 350 3,850	200 per CPU Unit for 3,200	790
Middle Schools 7-8 Local Cost of Gov. Plan	23 @ 2,000 = 46,000	None	None	SEA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7-8 LEA Plan	4 @ 2,000 = 8,000	Basic Skills 3 @ 2,600 = 7,800 2nd Drive 1 @ 350	200 per CPU Unit = 800	200	4 @ 2,000 = 8,000	Basic Skills 3 @ 2,600 = 7,800 1 @ 350	200 per CPU Unit = 800	200	4 @ 2,000 = 8,000	Basic Skills 3 @ 2,600 = 7,800 1 @ 350	200 per CPU Unit = 800	200	4 @ 2,000 = 8,000	Basic Skills 3 @ 2,600 = 7,800 1 @ 350	200 per CPU Unit = 800	200	4 @ 2,000 = 8,000	Basic Skills 4 @ 2,600 = 10,400 -0-	200 per CPU Unit = 800	
High Schools 9-12	8 @ 2,000 = 16,000	2nd Drive 8 @ 350 = 2,800	200 per CPU Unit = 1,600	320	8 @ 2,000 = 16,000	2nd Drive 8 @ 350 = 2,800 4 Graphic Tablets @ 800 = 3,200	200 per CPU Unit = 1,600	320	8 @ 2,000 = 16,000	2nd Drive 8 @ 350 = 2,800 Printers 4 @ 800 = 3,200	200 per CPU Unit = 1,600	320	9 @ 2,000 = 18,000	2nd Drive 9 @ 350 = 3,150 4 Printers @ 800 = 3,200	200 per CPU Unit = 1,800	320	9 @ 2,000 = 18,000	2nd Drive 9 @ 350 = 3,150 8 Green Monitors @ 200 = 1,600	200 per CPU Unit = 1,800	320
Vocational Technical School	2 @ 2,000 = 4,000 Lab	2nd Drive 2 @ 350 = 700 Lab	200 per CPU = 400	290	2 @ 2,000= 4,000 Inst. 1 Lab Printer	2nd Drive 2 @ 350 = 700 Inst. 1 @ 800 Printer	200 per CPU = 400	290	1 @ 2,000 = 2,000 Inst.	2nd Drive 1 @ 350 = 350 Inst. 1 @ 800 Printer	200 per CPU = 200	290	Additional 2 Graphic 1 Reg., 1 = 1,600	Equipment Tablets Lab @ 800	-0-	290	-0-	-0-	-0-	290
Mainframe Computer to Schools Hook-up					19 CRT 19 Printers and Peripheral Equipment	74,475			Programmer for System Educational			17,400	Educational Consortium Cost.				2 Modems @ 250 = 500		Soft-ware cost @ 500	
TOTALS	104,000	25,550	5,800	1,600	58,000	104,375	5,800	1,600	56,000	32,150	5,600	19,000	59,600	31,350	5,800	1,600	58,500	32,000	6,300	1,400
YEAR TOTALS	1983-84 $136,950				1984-85 $169,775				1985-86 $112,750				1986-87 $98,350				1987-88 $98,200			

TOTAL FIVE-YEAR COST $616,025

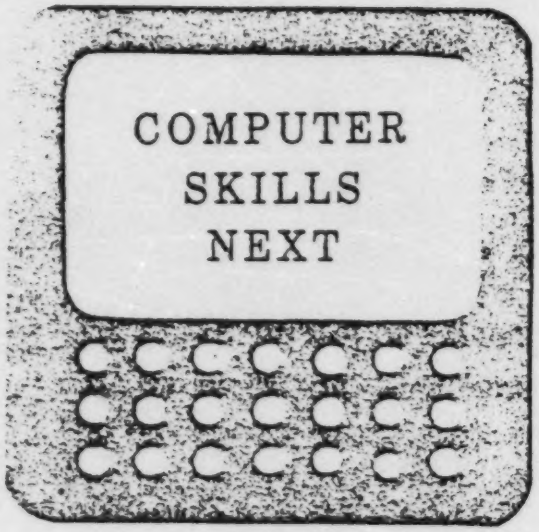
APPENDIX A

TENNESSEE STATE DEPARTMENT OF EDUCATION

COMPUTER LITERACY PLAN FOR 7TH AND 8TH GRADES

The following appendix is the plan submitted by the Tennessee State Department of Education for its Computer Literacy Plan for the 7th and 8th grades throughout the State of Tennessee.

The committee understands that this is a state proposal which has not yet been funded.



A Plan for Grades 7 & 8

STATE OF TENNESSEE

Department of Education

Fall, 1982

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INTRODUCTION

The Tennessee Statewide Microcomputer Advisory Committee is composed of sixteen members who represent classroom teachers, librarians, supervisors, and administrators in local school systems, as well as representatives of institutes of higher education (including technical institutes, colleges of education, and vocational education) and representatives of the State Department of Education. In addition, members of the State Department Computer Coordinating Committee, who represent each division of the department, have participated in meetings. The 1982-83 committee had their first meeting in September. At this meeting tasks for the year were identified. The first project was to develop a curriculum and plan for computer literacy in grades seven and eight. This project was to be completed by November. Beginning in January, the committee is to focus upon guidelines for computer science courses at the secondary level.

This report reflects the efforts of the committee in developing a proposed curriculum for computer literacy and in developing a plan for its implementation in grades seven and eight of Tennessee Public Schools. Section I, Curriculum, contains tentative goals and objectives for a computer literacy program in grades K-8. Section II, Teacher Training, outlines a plan for providing training in computer literacy to teachers in grades seven and eight. Section III examines the acquisition of microcomputer hardware. Section IV outlines additional resources needed at the state level.

This plan has been finalized by the efforts of committed educators across the state who participated on the advisory committee. Through their willingness to share their time, effort, and expertise, a proposed plan has been developed for a computer literacy program. The Tennessee State Department of Education wishes to express its appreciation to the members of the committee for their work in creating this plan.

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Tennessee Statewide Computer Advisory Committee

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Systems Development
Tennessee Department of Education

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Nashville State Technical Institute

Dr. Robert Carruthers, Assistant Professor
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Mr. Pete Carter, Vice Principal
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Ms. Faye Wilmore, Teacher
Dodson Elementary School
Metropolitan Nashville Public Schools

Dr. Gerald Ubben, Professor
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Other Participating Members Of

Tennessee State Department of Education Computer
Coordinating Committee

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Census & Psychological Services

R.V. Ball, Director
Fiscal Field Services

Brenda Barr, Program Coordinator
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Research & Development

Ross Mol, Coordinator
Educational Television Network

Jack Roberts, Director
BASIC SKILLS FIRST

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Executive Summary

This two-year computer literacy plan for grades 7 and 8 in Tennessee public schools is divided into five major sections. These sections contain requirements for curriculum, training, microcomputer hardware, administrative and support staff, and budget.

The major strands and goals and objectives for the program have been identified by the State-wide Microcomputer Advisory Committee. The curriculum is a 15 hour program for seventh and eighth grade students covering the following major topics: history, computer operations, computer applications, logic and problem solving, social impact and terminology. This program is implemented as an incentive program with 1/3 of the schools participating in a pilot program beginning January, 1984. It is recommended that the computer literacy program be mandated for all schools during the 1985-86 school year. Local school systems determine which personnel will teach computer literacy and how it will be scheduled in their school buildings.

The training program to initiate the computer literacy curriculum includes:

- A two-week course conducted during the summer of 1983 for persons who will become the "experts" or the trainers of teachers (60 people).
- A one-week training program conducted from September 1983 through December, 1984 for building level computer resource persons--those who will be teaching computer literacy to students (700 teachers).
- A two-day training program conducted from September 1983 through December, 1984 for all seventh and eighth grade teachers (approximately 4300 teachers).
- A two-day training program for State Department of Education personnel and teachers in BASIC SKILLS FIRST management program.

It is recommended that approximately 4,435 microcomputers be acquired for the computer literacy program in the schools. The state will organize five training centers requiring microcomputer hardware.

Required staffing for the program will be in three major areas: management, training, and support/leadership. A project director and training coordinator need to begin implementing the planned activities by Spring of 1983 to maintain the operational schedule. The plan includes a toll-free telephone "hot-line" for local school systems and the establishment of six clearinghouses for software review/evaluation.

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Section I: Curriculum

Definition of Computer Literacy

Computer Literacy is similar to any other term applied to basic skills in which literacy is based upon a continuum of skills and knowledge. This knowledge is identifiable by development stages, with each stage emphasizing, reinforcing, and elaborating upon skills from previous learning while, at the same time, introducing new concepts. All basic skills, particularly those in mathematics and language arts, are based upon proficiencies which increase in sophistication and difficulty as one progresses through the curriculum. Not every student is required to, or even capable of, performing mathematical computations in calculus, yet one expects a "literate" person to be able to perform addition, subtraction, multiplication, and division operations. In computer education, the ability to perform advanced computer programming operations is not required of each student, yet all students should understand the elementary concepts in computer programming.

Computer literacy can be based upon a continuum of skill development which begins at an awareness level where one understands what a computer is and continues to a proficiency level where one understands advanced programming techniques in one or several languages. At the awareness level concepts are introduced which explore what a computer is, how its "brain" works, and how the computer affects us in our daily life.

At the literacy level one has a working knowledge of how a computer functions and is able to perform simple programming operations. Inferences can be made about the impact of computers on the individual and society and when use of computer applications is appropriate. At this level, career opportunities are explored, and positions in computer operations are identified.

At the proficiency level one learns the complexities involved in computer operations. Advanced knowledge of one programming language is acquired, and complex sociological impacts of computers (both positive and negative) are understood.

Figure 1 represents the continuum of computer literacy. This appears as a one-dimensional model, but each step overlaps and builds upon the other.

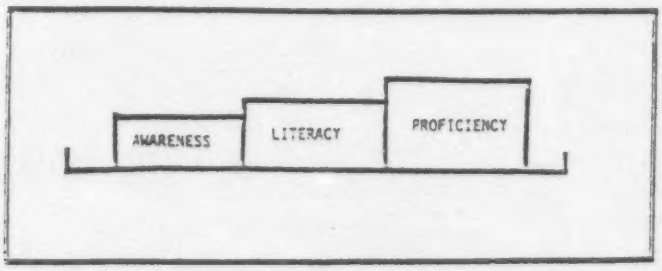

Figure 1: Computer Literacy Continuum

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The Curriculum, K-8

The curriculum outlined by the committee contains goals and objectives under six major strands from kindergarten through grade 8. It does not address goals and objectives for the proficiency level of the continuum. The curriculum was developed in a manner which allows for its modification and adaptation once the program is implemented, and evaluative information is obtained from teachers. It is anticipated that, as students' exposures to computers at the elementary level becomes more commonplace, the curriculum will more appropriately be taught at earlier grade levels, with increased difficulty of concepts and skills occurring in the seventh and eighth grade.

The curriculum is a 15 hour instructional unit for students in the seventh and eighth grades. This is a total of 30 hours of instruction in computer literacy. The curriculum is not presented in the sequence in which it is to be taught in the classroom, but rather as a framework for the goals and objectives which will be covered by the teachers. The present framework needs to be refined into teaching strategies and activities to spark the interest and motivate students to become increasingly involved in computer usage. In addition to teaching strategies and activities, resources for local systems need to be identified which interface with the goals and objectives of the program.

The six major strands of the curriculum are:

1) History
2) Computer Operations
3) Applications
4) Logic and Problem Solving
5) Social Impact
6) Vocabulary

Goals are identified for each strand. Student objectives are identified for grades K-3, 4-6, and 7-8. The code under the grade level represents: I=Introduced, R=Reinforced and M=Mastered.

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Strand HISTORY

Goal Be able to understand the historical development of the computer.

Objectives: Students will be able to:	K-3	4-6	7-8
1.1 Identify historical aspects of technology			
1.1.1 Describe and discuss the various ages			
1.1.1.1 Discuss the Pre-industrial times		I	R
1.1.1.2 Discuss the industrial revolution		I	R
1.1.1.3 Discuss the computer age		I	R
1.1.1.4 Discuss the future in relation to computers.			I
1.1.2 Describe and discuss the role of machines in assisting man			
1.1.2.1 Discuss how machines are used as power source			I
1.1.2.2 Describe the changing role of machines in assisting man			I
1.1.2.3 Discuss how machines can be used in control functions			I
1.1.2.4 Discuss how machines can be used as artifically intelligent devices			I
1.1.3 Identify and discuss the various people involved in technological developments			
1.1.3.1 Identify and discuss the inventors of major technological developments which affect, or can affect, the computer	I	R	R
1.1.3.2 Identify and discuss those who promote and use technological developments which affect, or can affect, the computer	I	R	R
1.2 Identify Historical Aspects of Computing			
1.2.1 Identify the early methods of computing			
1.2.1.1 Identify and discuss early counting methods	I	R	R
1.2.1.2 Discuss the early counting devices, e.g. abacus	I	R	R
1.2.2 Identify modern methods of computing	I		
1.2.2.1 Identify the various calculating devices	I	R	R
1.2.2.2 Discuss the use of data processing		I	R

Strand HISTORY (continued)

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Goal Be able to understand the historical development of the computer.

Objectives: Students will be able to:	K-3	4-6	7-8
1.2.3 Discuss the need for a computing device			
1.2.3.1 Describe why the computer might have been invented		I	R
1.2.3.2 Discuss the role of the computer and how the computer brought about changes in work and daily living.		I	R/M
1.2.4 Compare the various generations of computers			
1.2.4.1 Identify and discuss ENIAC or an example of the first generation of computers		I	R
1.2.4.2 Describe and discuss the transistor generation			I
1.2.4.3 Describe and discuss integrated circuit generation			I
1.2.4.4 Describe and discuss the microchip generation			I
1.2.5 Identify various people involved in computing			
1.2.5.1 Identify and discuss the inventors who contributed to the development of the computer	I	R	R
1.2.5.2 Identify and discuss the types of people who promote or use computers	I	R	R

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Strand COMPUTER OPERATIONS

Goal Be able to operate microcomputer system

Objectives: Students will be able to:	K-3	4-6	7-8
2.1 Identify the major components of a computer system			
2.1.1 Identify input devices such as tape drive, floppy disk drive, video monitor, keyboard, card reader/scanner	I	R	R/M
2.1.2 Identify the central processing unit including the control unit, the microprocessor and primary/secondary memory/ storage		I	R
2.1.2.1 Identify ROM		I	R
2.1.2.3 Identify tape and disk storage		I	R
2.1.3 Identify output devices such as tape drive, disk drive, video monitor, and printer		I	R/M
2.1.4 Describe proper care of input devices, the central processing unit, and output devices		I	R
2.2 Explain the function of the major components of a computer system			
2.2.1 Explain the function of various input devices such as tape drive, floppy disk drive, video monitor, keyboard, and card reader/scanner		I	R
2.2.2 Explain the function of the central processing unit including the control unit, the microprocessor (arithmetic/ logic unit), primary/secondary storage			I
2.2.3 Explain the function of output devices such as tape drive, disk drive, a video monitor, and printer			I
2.2.4 Explain the proper care of computer equipment	I	R	R
2.3 Initiate and Terminate Equipment Operation			
2.3.1 Demonstrate proper equipment configuration and connection			I
2.3.2 Demonstrate proper sequence of turning on equipment		I	R/M
2.3.3 Demonstrate loading and saving of program		I	R
2.3.4 Demonstrate use of keyboard and use of special purpose keys		I	R
2.3.5 Demonstrate procedure for write-protecting media		I	R
2.3.6 Demonstrate procedure for turning off equipment		I	R/M
2.3.7 Demonstrate proper care of computer equipment		I	R

Strand COMPUTER OPERATIONS

Goal Be able to operate microcomputer system

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Objectives: Students will be able to:	K-3	4-6	7-8
2.4 Operate system using prepared software and menu driven programs			–
2.4.1 Follow directions in a menu-driven program		I	R
2.4.2 Demonstrate program escape procedures		I	R
2.5 Operate system using system commands and program commands			
2.5.1 Demonstrate use of system commands such as: CATALOG, LOAD, RUN LIST, SAVE, RENAME, DELETE, LOCK, UNLOCK		I	R
2.5.2 Demonstrate use of programming statements such as: PRINT, LET, GOTO, IF-THEN, and arithmetic/logic symbols			I
OPTIONAL OBJECTIVES IF THE EQUIPMENT IS AVAILABLE:			
2.6 Operate computer systems with more sophisticated peripheral equipment			
2.6.1 Explain parallel and serial communications interface			I
2.6.2 Demonstrate use of multiple floppy disk drive			I
2.6.3 Demonstrate use of modem (direct connection or acoustic coupler)			I
2.6.4 Demonstrate use of optical scanner			I
2.6.5 Demonstrate use of hard disk drive			I
2.6.6 Demonstrate use of graphics tablet, light pen.			I

Strand APPLICATIONS:

Office of Planning

Goal Be able to demonstrate understanding of the applications of computers as machines, as tools, and as creative instruments.

Objectives: Students will be able to:	K-3	4-6	7-8
3.1 Explain how computer functions can aid in the effective management of information.			
3.1.1 Explain why computers are best suited for tasks requiring speed, accuracy, and repeated operations.		I	R/M
3.1.2 Describe information storage and retrieval capabilities of a computer.		I	R
3.1.3 Demonstrate the process through which computers search, sort, delete, update, and summarize data.		I	R
3.1.4 Describe how a computer is used in testing and statistical treatment of data.			
3.1.5 Demonstrate how computer graphics are used for visual display of graphs and illustrations.		I	R
3.1.6. Explain how computers can be used to predict, interpret. and evaluate data for decisionmaking.		I	R
3.1.7 Explain the meaning of "word processing" and give reasons for its importance.		I	R
3.1.8 Describe how computer simulations can be used in forecasting.			I
3.1.9 Recognize the definition of and some advantages of computer modeling/simulation.		I	R
3.2 Determine when a computer should be used and be able to identify certain models for specific applications			
3.2.1 List the operations for which computers are most commonly used and briefly state reasons.	I	R	R/M
3.2.2 Explain cost as a factor in computer usage.			I
3.2.3 Identify availability of software as a major limiter of computer use and give reasons for this problem.			I
3.2.4 Explain how storage capacity of computing units is a deciding factor in computer selection.			I
3.2.5 List several factors involved in the determination of the type of computer, micro or main frame for a specific task.			I

Strand APPLICATIONS

Goal Be able to demonstrate understanding of the applications of computers as machines, as tools, and as creative instruments.

Objectives: Students will be able to:	K-3	4-6	7-8
3.3 Describe how computers can be used in our schools			
3.3.1 Give examples of the uses of computers in areas such as language arts, mathematics, science, and social studies.		I	R
3.3.2 Select, load, and execute a program designed to assist students in instruction.	I	R	R/M
3.3.3 Demonstrate how computers can be used to entertain and educate by successfully selecting, loading, and executing a game from an educational area.	I	R	R/M
3.3.4 Name two computer languages well suited to educational applications.		I	R/M
3.4 List several ways that computers are used in our daily lives.			
3.4.1 Describe how computers are (or could be) used in at least six of the following major classifications:		I	R/M
a. Homes and recreation			
b. Business and industry			
c. Medicine			
d. Law and law enforcement			
e. Engineering			
f. Transportation			
g. Military defense			
h. Weather prediction			
i. Research and education			
j. Libraries and information retrieval			
k. Creative arts			
3.4.2 Name computer languages well suited to business/scientific applications.			I
3.4.3 Distinguish between various computer operation careers such as key puncher/data entry operator, computer operator, computer programmer, systems analyst, and systems manager.			I

Strand APPLICATIONS

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Goal Be able to demonstrate understanding of the applications of computers as machines, as tools, and as creative instruments.

Objectives: Students will be able to:	K-3	4-6	7-8
3.4.4 Identify and illustrate how computers may impact the future.			I
3.5 Explain how software is necessary to computer operation.			
3.5.1 Recognize that software refers to computer programs and includes operating systems, compilers, and user programs.		I	R
3.5.2 Recognize that a computer needs instructions to operate and gets instructions from a program written by a person in a programming language.		I	R/M
3.5.3 Recognize that computer programs are sets of sequential instructions which enable the computer to print, sort, calculate, and perform other functions.		I	R/M
3.5.4 Recognize that a computer has a mechanism in its internal structure which allows a program language to be converted to binary code (0 and 1).			I
3.5.5 Identify the need for data to be organized, or ordered, if it is to be useful.			I
3.5.6 State that data processing involves the transformation of data by means of pre-defined rules.			I
3.5.7 Identify an operating system as software that performs the file managing tasks of a computer such as loading programs, and copying files.			I
3.5.8 Give an example of a compiler and explain its function.			I
3.5.9 List examples of user programs available today with their uses.			I
3.5.10 Recognize that various brands of computers require specific operating systems and software to operate.		I	R/M
3.5.11 Select a piece of software from the computer library and evaluate it in terms of its intended function, compatibility with a particular computer, and ease of operation.			I
3.5.12 Recognize the uses of different types of networking to receive formation from internal/external sources.		I	R

Strand LOGIC AND PROBLEM SOLVING

Goal Be able to utilize systematic processes in problem solving.

Objectives: Students will be able to:	K-3	4-6	7-8
4.1 Develop a strategy (algorithm) for performing a task.			
4.1.1 Order specific given steps in the solution of a problem.	I	R	M
4.1.2 Choose the proper steps to the solution of a problem.	I	R	M
4.1.3 Choose and order the steps to the solution of a problem.	I	R	M
4.1.4 Recognize the definition of "algorithm".		I	R
4.1.5 Follow and give the correct output for a simple algorithm.		I	R
4.1.6 Given a simple algorithm, explain what it accomplishes.		I	R/M
4.1.7 Modify a simple algorithm to accomplish a new, but related, task.			I
4.1.8 Detect logic errors in an algorithm.			I
4.1.9 Correct errors in an improperly functioning algorithm.			I
4.1.10 Develop an algorithm for solving a specific problem.			I
4.1.11 Develop an algorithm that can be used to solve a set of similar problems.			I
4.2 Diagram the steps in performing a task.			
4.2.1 Identify the symbols used to develop a flowchart.		I	R/M
4.2.2 Develop a flowchart for a daily activity such as mowing the lawn or making a telephone call.		I	R
4.2.3 Read and explain a given flowchart.		I	R
4.2.4 Develop a flowchart for a given algorithm.		I	R
4.3 Analyze tasks to determine appropriateness of use of computer for problem solving.			
4.3.1 Recognize that a computer requires instructions in order to operate.		I	R/M
4.3.2 Recognize that computer programs are sets of sequential instructions which perform many tasks such as searching, sorting, calculating, and printing.		I I	R R
4.3.3 Identify the need for data to be organized if it is useful.			I

Strand LOGIC AND PROBLEM SOLVING

Goal Be able to utilize systematic processes in problem solving.

Objectives: Students will be able to:	K-3	4-6	7-8
4.3.4 Select an appropriate characteristic for ordering of data for a particular task. (e.g. Social Security, Last Name).			I
4.3.5 Design an elementary data structure for a given application (that is, provide order for the data).			I
4.3.6 Design an elementary coding system for a given application.			I
4.4 Learn rudimentary statements, commands, and structures of at least one high level language such as LOGO or BASIC.			I
4.4.1 Demonstrate use of simple concepts, statements and commands including:			
4.4.1.1 The concept of variable as a memory location.			I
4.4.1.2 System commands.		I	R
4.4.1.3 Input techniques		I	R
4.4.1.4 Output techniques.		I	R
4.4.1.5 Unconditional branching.			I
4.4.1.6 Conditional branching.			I
4.4.1.7 Debugging techniques.			I
4.4.2 Enter and execute an elementary program from a given flowchart.		I	R
4.4.3 Develop programs to perform tasks in areas such as social studies, business, science and mathematics.			I

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Strand: SOCIAL IMPACT

Goal The student will discuss the widespread use of computers in today's society.

Objectives: Students will be able to:	K-3	4-6	7-8
5.1 Discuss how and why computers are used in the following areas:			
5.1.1 Homes and recreation		I	R
5.1.2 Business and industry		I	R
5.1.3 Medicine		I	R
5.1.4 Law and law Enforcement		I	R
5.1.5 Engineering		I	R
5.1.6 Transportation		I	R
5.1.7 Military Defense		I	R
5.1.8 Weather Prediction		I	R/M
5.1.9 Research and Education		I	R
5.1.10 Libraries and Information Center		I	R
5.1.11 Government		I	R
5.1.12 Creative arts		I	R
5.2 Identify the availability of computer-related jobs in new areas within the next five years.			
5.2.1 Identify the educational requirement for career opportunities in computer operations.			I
5.2.2 Identify the educational requirement for career opportunities in computer programming.			I
5.2.3 Identify the educational requirement for career opportunities in computer equipment, design, construction and repair.			I
5.2.4 Identify jobs available in the immediate community directly associated with computers.		I	R
5.3 Discuss the positive/negative aspects of the computer			
5.3.1 Distinguish between human capabilities and computer capabilities.			I

Strand : SOCIAL IMPACT

DRAFT COPY

Goal : The student will discuss the widespread use of computers in today's society.

Objectives: Students will be able to:	K-3	4-6	7-8
5.3.2 Identify advantages and disadvantages of a data base containing personal information on a large number of people.			I
5.3.3 Explore how computers can personalize and impersonalize the procedures in fields such as education.			I
5.3.4 Discuss misuses of computers through security violations.			I
5.3.5 Discuss how computers are used in public surveillance.			I
5.3.6 Explore how computers affect the distribution and use of economic and political power.			I
5.4 Identify how computers may be used in the future.			
5.4.1 Identify potential future application problems.			I
5.4.2 Discuss possible future solutions for the identified problems.			I

Strand VOCABULARY DEVELOPMENT

Goal Be able to recognize vocabulary associated with computer usage.

Objectives: Students will be able to recognize the following terms:	K-3	4-6	7-8
Algorithm - A step-by-step set of directions for solving a specific type of problem.			I
Arithmetic/Logic Unit - The part of a computer that performs arithmetic and logical operations such as adding, subtracting, multiplying, and dividing numbers or sorting and comparing information.			I
BASIC - Beginners All-Purpose Symbolic Instructional Code. The most widely used computer programming language.		I	R /M
Binary Code - Code using only zero and one to represent data.			I
Bit - The smallest unit of digital information. It has only two states: zero and one.			I
Branch - An instruction which when met in a program, causes a move to another part of the program, deviating from the normal sequency of the program. Branch statements are one of two types: conditional statement command (IF . . . THERE); or unconditional statement comment (60 TO).			I
Bug - An error in programming which causes faulty outputs. May also mean a hardware malfunction or design error either in the computer or in its peripherals.		I	R
Byte - The basic unit of information in a computer. Commonly consists of a sequence of eight binary bits, usually handled as a unit. One byte usually represents one character.			I
Central Processing Unit (CPU) - The part of the computer hardware that takes instructions from computer memory, figures out what operations the instructions specify, and then carries out the instructions.		I	R /M
Chip - A large scale integrated circuit, containing electronic circuitry equivalent to thousands of transistors, resistors, and other components.		I	R
COBOL - Common Business Oriented Language. A programming language designed for business and data processing application.		I	R
Compiler - A program inside the computer that translates machine language into symbols that can be understoody by humans and vice versa.			I

Strand VOCABULARY DEVELOPMENT

Goal Be able to recognize vocabulary associated with computer usage.

Objectives: Students will be able to recognize the following terms:	K-3	4-6	7-8
Computer - An electronic machine designed for the input, storage, manipulation, and output of alphabetic and numeric symbols.	I	R	R/M
Computer Assisted Instruction (CAI) - Direct instruction conducted by the computer. Examples are: drill and practice, tutorial, simulation and gaming, and problem solving.		I	R/M
Computer Program - A set of sequential instructions written in some language that can be interpreted and understood by a computer.	I	R	R/M
Data - The information given to, or received from, a computer.		I	R
Data Entry Operator - A person who enters data into a computer, usually through a keyboard.			I
Data Processing - Organizing, describing, rearranging and changing information such as words, sentences, and numbers.			I
Debug - To remove the bugs (errors) from a computer program or other set of directions.		I	R
Floppy Disk - A flexible mylar disk, which looks like a bendable 45 rpm record which serves as a storage device.	I	R	R/M
Flowchart - A programming technique using shaped blocks indicating the direction and sequence of operations in a program.		I	R
FORTRAN - Formula Translator. A high level computer programming language particularly suited for mathematically oriented computer applications.			I
Graphics - Characters that can be used to form figures, shapes, and forms on the CRT or printer. Computers can be used to input, store, manipulate and output architectural and engineering maps, pictures, and so on. This aspect of computer science is called computer graphics.	I	R	R
Hardware - A computer system consisting of physical machinery. The five main hardware components are input units, primary storage, central processing unit, secondary storage and output units.	I	R	R/M
Input Devices - Information that is to be taken from an external source and transferred into the internal storage hardware of a computer. Keyboard, punch cards and tapes are input devices.	I	R	R/M
Integrated Circuit - A tiny complex of electronic components and their connections that is produced in or on a small slice of material such as silicon.			I

Strand VOCABULARY DEVELOPMENT

Goal Be able to recognize vocabulary associated with computer usage.

Objectives: Students will be able to recognize the following terms:	K-3	4-6	7-8
Interface - An electronic circuit used to connect one electrical device to another electrical or mechanical device to allow the flow of data between uints.			I
K (short for KILO = 1,000)- With the microcomputer it refers to RAM or ROM memory capability, i.e., 16K=approximately 16,000 bytes of information. A measure of storage capacity, K = 2 raised to the 10th power, which is 1024.		I	R
Language - A format by which a programmer can communicate more efficiently with a computer where pre-determined commands will yield requested actions. BASIC is one of the most popular languages.	I	R	R/M
LOGO - A computer programming language developed by Seymour Papert at Massachusetts Institute of Technology. It was especially designed for use by elementary students.	I	R	R
Mainframe - A term referring to the CPU and its enclosure or to large computers.		I	R/M
Memory - The integrated circuit that can execute instructions. It is one component of a microcomputer. It is the brains of the central processing unit (CPU).	I	R	R/M
Microcomputer - A small computer that uses a microprocessor for its central processing unit.	I	R	R/M
Microprocessor - A single chip containing all the electronic logic of a CPU.		I	R
Minicomputer - Computers larger than microcomputers and smaller than mainframes.		I	R/M
Modeling and Simulation - A model is a representation of certain key features of an object or system to be studied. Scientific models often make use of complex formulas and involve substantial use of mathematics. If a computer is used to solve the equations and carry out the necessary calculations, the process is called a computer simulation.		I	R
Modem - An abbreviation of the words "MOdulator-DEModulator". It is a device which permits computers to transmit information over regular telephone lines.			I
Networking - A way (or system) of sharing information among computers, a linkage between computers for communication.			I

Strand VOCABULARY DEVELOPMENT

Goal Be able to recognize vocabulary associated with computer usage.

Objectives: Students will be able to recognize the following terms:	K-3	4-6	7-8
Output Devices: Information that is to be taken from a computer and displayed or stored in some manner. Display screens, printers, punch cards and tapes are output devices.		I	R/M
PASCAL - A computer language designed to facilitate the writing of programs in a structured and well-organized manner.		I	R
Peripherals - Computer-related hardware other than the processing unit and usually packaged separately but connected to the processing unit, such as printers or disk drives.		I	R/M
PILOT - Programmed Inquiry Learning Or Teaching. An interactive computer language designed to be useful in writing programs for teaching which includes dialogue with students and branching in instructional sequences.		I	R
Printer - A peripheral device which accepts output data from the microprocessor and prints characters on paper.	I	R	R
Program - A series of instructions to a computer which cause the computer to solve a problem or perform a task.	I	R	R/M
Programmer - One who places commands into the computer which represents the steps in solving a problem.	I	R	R
Random Access Memory (RAM) - "In-the-machine" space available for the storage and manipulation of programs and data.		I	R
Read Only Memory (ROM) - Memory built in by the manufacturer and contains operating information.		I	R
Software - Computer programs of all kinds.	I	R	R/M
Systems Analyst - A person who analyzes data and determines how to best manipulate the data for a user's need.			I
Technology - Applied Science.	I	R	R/M
Terminal - A peripheral device which facilitates human communication with a computer. Usually it consists of a keyboard with alphabetic and numeric characters (couples with a printing mechanism or a CRT).	I	R	R
Video Display Unit - A component of a microcomputer system which displays the output on a screen similar to a TV screen. A television monitor is a type of video display unit.			I
Word Processing - Use of a computer as an automated typewriter and text editor.			I

TENNESSEE STATE DEPARTMENT OF EDUCATION

Computer Literacy Curriculum

DATE	ACTIVITY
SPRING 1983	-Begin development of teacher guide for computer literacy
SUMMER 1983	-Complete teacher guide for computer literacy
SUMMER 1984	-Revise teacher guide for computer literacy

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Office of Planning

Section II: Training for Professional Personnel

A major consideration in implementing a program for computer literacy in the State of Tennessee is the training of professional personnel. For proper instruction to occur in the classroom, teachers must be prepared to teach the computer literacy curriculum. This training is a comprehensive program focusing on four different components: the training of trainers, the training of local computer resource teachers, the training of all seventh and eighth grade teachers, and the training of state department personnel and teachers in the BASIC SKILLS FIRST management system.

Since the program will be initiated at the seventh and eighth grade level, the committee recommends that all seventh and eighth grade teachers in the state have a cursory understanding of the basic concepts to be taught in the program. It is also recommended that the building level computer literacy resource staff (the teachers who actually conduct the computer literacy classes) have more extensive training in computer literacy. To facilitate these two types of training it is recommended that a core of "experts" be trained to provide the training needed by seventh and eighth teachers.

Therefore, this plan provides for the following training to initiate the computer literacy curriculum:

1) A two-week course conducted during the summer of 1983 for persons who will become the "experts" or the trainers of teachers (60 people).

2) A one-week training program conducted from September 1983 through December, 1984 for building level computer resource persons--those who will be teaching computer literacy to students (700 teachers).

3) A two-day training program conducted from September 1983 through December, 1984 for all seventh and eighth grade teachers (approximately 4300 teachers).

4) A two-day training program for State Department of Education personnel and teachers in BASIC SKILLS FIRST management program.

To accomplish this extensive inservice training program five centers with 15 microcomputers in each center will be located in the following areas of the state: Johnson City, Knoxville, Chattanooga, Nashville, and Memphis. The equipment in the Memphis Center will be moved to Jackson during part of the training sessions to better accommodate persons from Northwest Tennessee.

During the Spring of 1983 six core instructors will develop the curriculum for the teacher training programs. During the Summer of 1983 two-week training programs for trainers of teachers will be held in three locations

throughout the state. At these training sessions 45 State Department of Education personnel and 15 college professors will become familiar with the computer literacy program and with a training program to teach computer literacy to teachers.

Throughout the Fall of 1983 the five centers across the state will train approximately one-third of the seventh and eighth grade teachers. This is approximately 1440 teachers from schools which will participate in the pilot program during 1983-84. The training will be two-day computer literacy workshops. Additionally, one teacher from each of the pilot schools (1/3 of all seventh and eighth grade schools) will be trained in five-day workshops to become the building level computer literacy resource teacher in the seventh and eighth grade pilot schools. This training will include approximately 250 teachers.

Throughout the Spring of 1984 the above procedures will be repeated with the second one-third of the seventh and eighth grade teachers being trained in computer literacy and to become building level resource persons.

Also, during 1983-1984, the five computer centers will be utilized to train State Department Staff and teachers in the operation of the BASIC SKILLS FIRST management program. Demonstration of the program will also be provided to local school systems, upon request.

Throughout the Fall of 1984 the remaining one-third of seventh and eighth grade teachers will receive the two-day computer literacy training, as well as a one-week training program for the building level resource persons. By the Spring of 1985, all seventh and eighth grade teachers in Tennessee will have received the opportunity to participate in computer literacy training. Workshops periodically will be scheduled as new seventh and eighth grade teachers require training.

To provide for improvement of the program, the trainers will convene in Nashville in the Fall of 1983 and in the Spring of 1985 to evaluate the program and to update their skills. During the Summer of 1984 the trainers will receive a two-week updating program to keep them aware of new technologies and information that has recently become known.

The following chart reveals the timeline of activities associated with this training program.

TENNESSEE STATE DEPARTMENT OF EDUCATION

Timeline for Implementing

Teacher Training Program for Computer Literacy

DATE	ACTIVITY
SPRING 1983	-Develop program for training trainers -Select 12 core instructors for trainers of 60 workshop trainers -Review (2 days) 2 week training program for trainers -Develop training materials for training packets
SUMMER 1983	-Provide two-week training of trainers workshops in three locations: Memphis, Nashville, Knoxville for 45 State Department of Education personnel and fifteen professors -Provide two-day workshop for 20 State Department of Education personnel and teachers in BASIC SKILLS FIRST management program in three locations: Memphis, Nashville, Knoxville
FALL 1983	-Provide 50 two-day computer literacy workshops at five centers for 1,450 seventh and eighth grade teachers -Provide fifteen one-week computer literacy workshops at five centers for 250 seventh and eighth grade computer literacy resource teachers

DATE	ACTIVITY
FALL 1983 (cont.)	-Provide two day workshop for 20 State Department of Education personnel and teachers in BASIC SKILLS FIRST management program in three locations: Memphis, Nashville, Knoxville -Meet with trainers for two days in three locations for program review/revision
SPRING 1984	-Provide 50 two-day computer literacy workshops at five centers for 1,450 seventh and eighth grade teachers -Provide fifteen one-week computer literacy workshops at five centers for 250 seventh and eighth grade computer literacy resource teachers -Provide two-day workshop for 20 State Department of Education personnel and teachers in BASIC SKILLS FIRST management program in three locations: Memphis, Nashville, Knoxville
SUMMER 1984	-Provide two-week advanced program for trainers to update information and advances in technology - Nashville -Provide two-week advanced training program for twenty outstanding classroom teachers Nashville -Provide two-day workshops for 20 State Department of Education personnel and teachers in BASIC SKILLS FIRST management in three locations: Nashville, Knoxville, Memphis

DATE	ACTIVITY
FALL 1984	-Provide 50 two-day computer literacy workshops at five centers for 1,450 seventh and eighth grade teachers -Provide 15 one-week computer literacy workshops at five centers for 250 seventh and eighth grade computer literacy resource teachers -Provide two-day workshop for 20 State Department of Education personnel and teachers in BASIC SKILLS FIRST management program in three locations: Memphis, Nashville, Knoxville

Office of Planning

Section III: Microcomputer Hardware

This plan recommends that one microcomputer be provided for every thirty seventh and eighth grade students in a school system. If consideration is given to the number of classes taught per day and the length of the school term, this 30:1 ratio is equivalent to three students being able to utilize one machine at a time. The literature supports this 3:1 ratio for teaching computer literacy with a "hands-on" approach. With an estimated 133,050 student membership in grades seven and eight, it is anticipated that 4,435 microcomputers should be purchased for the program.

Five state computer centers will be established for teacher training. Each center will be equipped with fifteen microcomputers, two scanning devices, and two printers. It is anticipated that some centers may require additional space/furniture than is currently available in the district offices.

The following chart reveals the timeline of activities for microcomputer hardware for the computer literacy program.

TENNESSEE STATE DEPARTMENT OF EDUCATION

Microcomputer Hardware

DATE	ACTIVITY
SUMMER 1983	-Purchase 15 Microcomputers per Center (5 Centers) -Purchase 2 Scanning Devices/2 Printers for 5 Centers -Acquire necessary space/furniture for centers -Maintenance and Repair
FALL 1983	-Provide funds to 1/3 of local school systems for Microcomputer Hardware
SUMMER 1984	-Provide funds to 1/3 of local school systems for Microcomputer Hardware
FALL 1984	-Provide funds to 1/3 of local school systems for Microcomputer Hardware
SUMMER 1984	-Maintenance & Repair Computer Center Equipment -Overhead for Computer Centers Physical Facility

Section IV: Administrative and Support Services

The implementation of a comprehensive microcomputer literacy program requires administrative and program personnel. Resources must be available to local school systems for program implementation and technical assistance. Three methods of providing assistance are through state department personnel, a toll-free "technology hot-line," and software review and evaluation services.

With the increasing role of technology in education and the need for current information and technical expertise, it is imperative that the State Department of Education provide leadership and program support services to local school systems. Program support services are required in the nine district field service centers. The program should be coordinated by an administrative staff located in the central office.

In addition to personnel requirements, a program for computer literacy requires immediate answers to technical questions. It is recommended that a toll-free "technology hot-line" be established for local school systems to use for response to technological questions.

A major area of concern to school systems in the use of microcomputers is the selection of software. School systems in Tennessee need technical advice on available software for microcomputers and on evaluative information concerning certain programs. It is recommended that the state establish clearinghouses at six universities in Tennessee for the review and evaluation of microcomputer software. Each clearinghouse would focus on one specific area of software such as basic skills, administration, secondary curriculum, vocational education.

The following chart reveals the timeline of activities recommended for Administrative and Support Services for the computer literacy program.

DATE	ACTIVITY
SUMMER 1984 (cont.)	-Training Component Training Coordinator Secretarial Travel Supplies, Telephone, Materials -Program and Leadership Support Support Staff Travel Supplies, Telephone, Materials Toll Free "hot-line" number
FALL 1984	-Continue six software clearinghouses

TENNESSEE STATE DEPARTMENT OF EDUCATION

Administrative and Support Services

DATE	ACTIVITY
SPRING 1983	-Program Management Director Computer Literacy Training Coordinator Secretary (1/3 of the year)
SUMMER 1983	-Program Management Director of Computer Literacy Assistant Director Secretary Travel Supplies, Telephone, Materials -Training Component Training Coordinator Secretarial Travel Supplies, Telephone, Materials -Program and Leadership Support Support Staff Travel Supplies, Telephone, Materials Toll Free "hot-line" number
FALL 1983	-Establish six software clearinghouses
SUMMER 1984	-Program Management Director of Computer Literacy Assistant Director Secretary Travel Supplies, Telephone, Materials

APPENDIX B

GLOSSARY

ACOUSTIC COUPLER - A mechanical device that allows a telephone handset to be connected to a modem (see modem). The term is sometimes used to refer to the entire modem.

ADDRESS - A way of identifying any location in the memory of a computer.

ALGORITHM - A specific set of steps to solve a problem.

APPLICATION PROGRAM - Software designed for a specific purpose (such as accounts payable or receivable, payroll, inventory, etc

ARTIFICIAL INTELLIGENCE - A specialized field of research in computer science. The term refers to the ability of a computer to perform functions normally carried out by the human brain (such as reasoning and learning).

ASCII - The American Standard Code for Information Interchange. The most generally used format for representing and exchanging textural information among computers. Under the code, each of 96 characters (letters, numbers, and symbols) is given a unique binary number code (1s and 0s).

ASSEMBLY LANGUAGE - A means of communicating with a computer at a low level. Assembly language lies between high-level language (such as BASIC and Pascal) and machine language (the 1s and 0s the computer understands at its most basic level). Programmers use assembly language to make efficient use of memory space and to create a program that runs quickly.

BACKUP - An extra copy of software, normally kept on file in case the original program is damaged or lost.

BASIC - Beginner's All-purpose Symbolic Instruction Code. The most used high-level language for small computers.

BAUD - A measure of the speed at which data travels (normally between a computer and a peripheral or between two computers).

BINARY - A numbering system that uses only 1s and 0s. It is an efficient way of storing information in a computer since the hundreds of thousands of microscopic switches in the computer can only be on (1) or off (0).

BINARY DIGIT - Known most commonly as a "bit," a binary digit is either a 1 or a 0. Taken together, a number of bits are used to represent data inside a computer (see BYTE).

BIT - Same as binary digit.

BOOTSTRAP - A piece of software, usually stored permanently in memory, that activates other pieces of software in order to brin the computer from "off" into readiness for use.

BPS - Bits per second. A measure of data-transmission speed showing the number of bits of information that pass a given point in one second. In small computers, the most common bps used is 300.

BREAK - An interruption of a transmission. Most small computer keyboards have a Break key that tells the computer to stop what it's doing and wait for further instructions.

BUBBLE MEMORY - A new method of storing information for a computer using microscopic magnetic bubbles. Although the technology was developed almost a decade ago, it is still expensive and not yet generally available for small computers.

BUFFER - An area in the computer's memory used to temporarily store information. When using a printer, a buffer is needed because the printer operates much more slowly than the computer.

BYTE - A sequence of bits that represents a single character. In most small computers, a byte is eight bits.

CAD/CAM - Computer-Aided Design/Computer-Aided Manufacturing. CAD/CAM is normally done on large computers because large amounts of memory and processing power are required.

CAI - Computer-Aided Instruction. Computers used to teach normally involve a two-way "conversation" between the student and the computer; the computer informs the student of mistakes as he makes them, and is able to respond to the student's demonstrated lack of knowledge.

CHANNEL - A path for the transmission of information between two points.

CHARACTER - A single letter, number, or other symbol. In a small computer, a character is normally represented by eight bits (one byte).

CHIP - A generic term for an integrated circuit (IC), a single package holding hundreds or thousands of microscopic electronic components. The term comes from the slices (chips) of silicon of which they are composed.

CLOCK - In a small computer, a repeating signal (usually in the range of millions of cycles per second) that controls the microprosessor "brain." Each time the clock sends a pulse, the computer performs a single task.

COMMAND - A word or character that causes a computer to do something.

COMMUNICATION - The transmission of data between two points.

COMPILER - A piece of software that takes a series of commands written in a high-level language and translates them into a lower-level language more efficient for the computer to use.

COMPUTER NETWORK - Two or more connected computers that have the ability to exchange information.

COMPUTER PROGRAM - A series of commands, instructions, or statements put together in a way that tells a computer to do a specific thing or series of things.

CORE MEMORY - An outdated term for the main memory of a computer. Although core memory has been replaced by semiconductor memory, the term is often used to represent main memory.

CP/M - Control Program for Microprocessors. One of the oldest and most popular operating systems for small computers. An operating system is a group of programs that is often compared to a traffic cop because it actually controls what the computer is doing by acting as an intermediary between the hardware and the software. Any piece of applications software must be written for a specific operating system. CP/M was introduced in 1975 and has become one of the most popular operating systems; an estimated 250,000 small computers use it. Thousands of specialized application programs have been written to be used with CP/M.

CPU - Central processing unit. The heart of a computer that controls all operations of all parts of the computer and does the actual calculations.

CRT - Cathode-ray tube. A TV-like display used with most small computers to show the information the computer has output.

CURSOR - A position indicator on a CRT. It's normally a flashing or nonflashing square or rectangle.

DATA - A general term meaning any and all information, facts, numbers, letters, symbols, etc., which can be acted on or produced by a computer.

DATA BASE - A collection of related data that can be retrieved by a computer (such as a mailing list or list of accounts).

DEBUG - To go through a program to remove mistakes.

DIAGNOSTIC - A specialized program that checks the computer for problems and tries to isolate any problems that it finds.

DISK - A round piece of magnetic-coated material used to store data with greater density, speed, and reliability than is available on cassettes (see FLOPPY DISK).

DISKETTE - See DISK.

DISPLAY - A method of representing information in visible form. The most common displays used with small computers are CRTs and printed paper.

DOCUMENTATION - (1) The instruction manual for a piece of hardware or software. (2) The process of gathering information while writing a computer program so that others using the program are able to see what was done.

DOWNTIME - Any period of time when the computer is not available or not working.

DUMP - To copy all information available from one form of storage to another.

EDIT - To modify or add data to an existing document or program.

EMULATION - A process by which some computers can run programs not specifically written for them.

EXECUTE - To carry out an instruction or series of instructions.

FIRMWARE - A term referring to software that has been permanently placed in memory - usually into a ROM (read-only memory).

FLOPPY DISK - A disk storage device made from a thin, circular piece of magnetic material. The usual disk sizes used with small computers are 5¼ inch and 8 inch.

FLOWCHART - A common method of graphically planning what a piece of software should do before the actual writing process begins, or for describing what it does after it is written.

FORTRAN - FORmula TRANslation. A high-level computer language used primarily for mathematical computations. Although FORTRAN is available for some small computers, it is mainly used with large commercial systems.

GARBAGE - Meaningless information.

GRAPHICS - Pictorial information in two dimensions.

HANDSHAKING - A preliminary exchange of information between a computer and an accessory (such as an acoustic coupler) which verifies that one has established communication with the other.

HARD COPY - A printout of information produced by the computer.

HARDWARE - The physical part of the computer (such as the CRT, CPU, memory, etc.), as opposed to software.

HEXADECIMAL - A number system with the base of 16. It is commonly used by programmers to indicate locations and contents of a computer's memory.

HIGH-LEVEL LANGUAGE - A method of programming that allows a person to give instructions to a computer in a form using letters, symbols, or English-like text, rather than in the 1s and 0s code which the computer understands.

IMPACT PRINTER - A printer that produces hard copy by physically striking a ribbon and paper.

INPUT - The transfer of data into the computer.

INPUT/OUTPUT - Called I/O for short, this is a general term for the equipment (such as modem or printer) connected to a computer and the two-way exchange of information that goes on between the computer and the peripheral.

INSTRUCTION - A command to the computer telling it to do one specific thing.

INTEGRATED CIRCUIT - Also known as a chip, this is a group of interrelated circuits in a single package.

INTERACTIVE - Describes a computer system where a two-way conversation goes on between the user and the computer.

INTERFACE - A piece of hardware of software used to connect two devices (computers and peripherals) that cannot be directly hooked together.

INTERPRETER - A computer program which translates s single line of a high-level language at a time for the computer. Interpreters are more convenient but less efficient that compilers.

LINE PRINTER - A type of high-speed computer printer that prints an entire line at a time (instead of a character at a time).

LOAD - To put data and/or programs into a computer.

LOCATION - A single specific place within computer memory where a piece of data is stored. A location is usually identified by a number (known as an address).

LSI - Large-scale integration. A single integrated circuit which has more than 100,000 cirucits on it.

MACHINE LANGUAGE - The "native language" of a computer; those fundamental instructions the machine is capable of recognizing and executing. The instructions are represented by binary code (1s and 0s).

MEMORY - Circuitry and devices that hold the binary 1s and 0s the computer can access. Examples are main memory (integrated circuits), floppy disks, cassette tape, etc.

MICROPROCESSOR - The central processing unit of a computer (usually in a single integrated circuit) that holds all the elements for manipulating data and performing arithmetic calculations.

MIS - Management information system. The use of a computer for providing information useful to managers (such as inventories, sales, accounts payable and receivable, etc.).

MODEM - Short for MOdulator/DEModulator. An electronic device that allows computer equipment to send and receive information through telephone lines. There are two major types: direct-connect modems and acoustic couplers. Direct-connect modems usually plug directly into a telephone wall jack; acoustic couplers use the telephone handset for sending and receiving information.

NETWORK - An interconnected system of computers and/or terminals. The components do not have to be physically close to one another and are often connected by telephone lines.

NODE - A station on a network. A node can be a computer or terminal.

OPERATING SYSTEM - "Traffic cop" software that oversees the overall operation of a computer system.

PASCAL - A high-level programming language named after the seventeenth-century French mathematician Blaise Pascal.

PERIPHERALS - Equipment (usually hardware) that is external to the computer itself. The most common peripherals used with small computers are disk drives, printers, and cassette-tape recorders.

PRINTER - An output device that produces hard copy.

PRINTOUT - Hard copy produced by a printer.

PROGRAM - (1) A set of instructions that tell a computer to do something. (2) To prepare the set of instructions.

RAM - Random-access memory. The main type of memory used in a small computer. The time required for the computer to find one piece of information in RAM is essentially the same no matter where the information is stored. Also known as read/write memory because data in RAM can be easily changed.

ROM - Read-only memory. Memory where information is permanently stored and cannot be altered. This form of memory is also random-access.

RS-232C - A technical specification published by the Electronic Industries Association which specifies one way in which a computer communicates with a peripheral (such as a modem or terminal).

SOFTWARE - Programs or segments of programs. The term was coined to contrast with hardware - the actual mechanics and circuitry of a computer.

SOFTWARE HOUSE - A company that writes programs or customizes programs specifically to the needs of an individual customer.

SYSTEM - An organized collection of hardware and software that works together.

SYSTEM SOFTWARE - General-purpose programs that allow programmers to write or modify applications programs. BASIC may be considered part of the system software; so is the computer's operating system.

TELECOMMUNICATIONS - Transmission of data between a computer and another computer or terminal in a different location. It can be done with phone lines, satellites, radio waves, optical fibers, or other means.

TERMINAL - A piece of equipment with a keyboard for input and an output device such as a CRT or printer. A terminal is used to communicate with the computer.

TIMESHARING - A process whereby the facilities of a single (usually large) computer are shared by a number of users. Timesharing requires large amounts of memory and special software to make it appear that each user has the whole computer to himself.

TRACK - A section of a disk or tape.

TURNKEY SYSTEM - A computer system in which all the hardware and software has been installed. Theoretically, all you have to do is turn it on.

VOLATILE MEMORY - Hardware which requires continuous electrical power to keep from losing information. Most RAM is volatile; ROM is not.

WORD - A group of characters or data that occupies one location in the computer's memory.

WORD PROCESSING - The entry, manipulation, editing, and storage of text using a computer.